Maintenance and Service Guide

HP Pavilion x360 15 Convertible PC

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Product notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to http://www.microsoft.com for details.

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For any further information or to request a full refund of the price of the computer, please contact your seller.

Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

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1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	**HP Pavilion x360 15 Convertible PC**
	Model number: 15-dq0xxx
	CTO model: 15t-dq000
Processor	Intel® Core® i7-8565U (1.8 GHz, turbo up to 4.6 GHz, 2400 MHz FSB, 8 MB L3 cache, quad core, 15 W)
	Intel Core i5-8265U (1.6 GHz, turbo up to 3.9 GHz, 2400 MHz FSB, 6 MB L3 cache, dual core, 15 W)
	Intel Core i3-8145U (2.1 GHz, turbo up to 3.9 GHz, 2400 MHz FSB, 4 MB L3 cache, dual core, 15 W)
Graphics	**Internal graphics**
	Intel UHD Graphics 620
	Supports HD decode, DX12, and HDMI
	Hybrid graphics
	Radeon 535 with up to 4096 MB of dedicated video memory (Core i7 processor)
	Radeon 535 with up to 2048 MB of dedicated video memory (Core i5 processor)
	Supports Optimus
	Supports GPS (GPU Performance Scaling)
Panel	**39.6 cm (15.0 in) WLED, anti glare, slim-flat (3.2 mm), eDP, narrow bezel, touch; 16:9 ultra wide aspect ratio; typical brightness: 220 nits, 45% NTSC**
	High-definition (HD) (1366 × 768), SVA
	Full high-definition (FHD) (1920 × 1080), UWVA
	Touch solution with flush glass, multitouch enabled
	Supports active stylus
	Supports simultaneous pen and touch
Memory	**Two SODIMM slots, non-accessible/non-upgradeable**
	DDR4-2400 dual channel support
	Supports up to 16 GB maximum system memory in the following configurations:
	• 16 GB (8 GB × 2)
	• 12 GB (8 GB × 1 + 4 GB × 1)
	• 8 GB (8 GB × 1 or 4 GB × 2)
	• 6 GB (4 GB × 1 + 2 GB × 1)
	• 4 GB (4 GB × 1)
Storage	**Supports 2.5 in, 7.2 mm SATA hard drives**

Table 1-1 Product components and their descriptions (continued)

Category	Description
	Support for solid-state drive + hard drive
	M.2 solid-state drive expansion capability on single hard drive models
	Accelerometer/hard drive protection support
	Single hard drive configurations
	2 TB, 5400 rpm, 7.2 mm
	1 TB, 5400 rpm, 7.2 mm
	500 GB, 5400 rpm, 7.0 mm
	Dual storage configurations:
	256 GB, PCIe, solid-state drive + 1 TB hard drive
	128 GB, SATA-3, TLC, solid-state drive + 1 TB hard drive
	M.2, SATA-3, TLC solid-state drive:
	128 GB
	PCIe, NVMe, M.2 solid-state drives:
	512 GB
	256 GB
	Intel Optane (3D Xpoint) Solution PCIe, Gen3 × 2, M.2 solid-state drive
	16 GB (Optane) + 2 TB, 5400 rpm, 7.2 mm hard drive
	16 GB (Optane) + 1 TB, 5400 rpm, 7.2 mm hard drive
Audio	**Audio brand**: B&O Play
	Audio control panel: B&O Play Audio Control
	Supports HP Audio Boost
	Dual speakers
Video	**HP Wide Vision HD Camera** - indicator LED, USB 2.0, HD BSI sensor, f2.0, WDR, 88° WFOV
	720p by 30 frames per second
	Dual array digital microphone with appropriate software - beam forming, echo cancellation, noise suppression
Sensors	Gyroscope/E-compass/Accelerometer
	Accelerometer (two – one for hard drive protection/CoolSense, the other for panel rotation)
	Sensor hub
Wireless	**Integrated wireless options with dual antennas (M.2/PCIe):**
	Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)
	Integrated wireless options with dual antennas (M.2/MIPI/BRI):
	Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5 (non-vPro) (MU-MIMO, Gigabit Wi-Fi speeds supported)

Table 1-1 Product components and their descriptions (continued)

Category	Description
	Integrated wireless options with single antenna (M.2/PCIe):
	Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)
	Support for Miracast
	Wi-Fi BIOS SAR
Ports	HP Smart Plug AC adapter (4.5 mm barrel)
	Headphone/microphone combo jack
	High-definition multimedia interface (HDMI) v.1.4, supporting up to 1920 × 1080 at 60 Hz
	Hot plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected)
	USB 3.1 Gen 1 Type A ports (2)
	USB 3.1 Gen 1 Type-C port (supports data transfer)
Media card reader	Supports microSD/SDHC/SDXC
	Push-push insertion/removal
Internal card expansion	One M.2 slot for WLAN
	One M.2 slot for solid-state drive
Keyboard/pointing devices	**Keyboard**
	Full-sized, textured, island-style, keyboard
	Full-size, two coat paint, island-style keyboard
	TouchPad requirements
	ClickPad with image sensor
	Multitouch gestures enabled
	Precision Touchpad supported
	Support for modern trackpad gestures
	Taps enabled as default
Power requirements	**Battery**
	Supports a 3-cell, 41 Whr, polymer/prismatic-mix battery
	Battery life enhancement
	Supports battery fast charge
	AC adapter
	65 W HP Smart AC adapter (non-PFC, standard barrel, 4.5 mm, right angle)
	65 W HP Smart AC adapter (non-PFC, standard barrel, 4.5 mm) for use in Argentina
	65 W EM HP Smart AC adapter (non-PFC, standard barrel, 4.5 mm)
	45 W HP Smart AC adapter (non-PFC, standard barrel, 4.5 mm, right angle)
	45 W HP Smart AC adapter (non-PFC, standard barrel, 4.5 mm) for use in Argentina

Table 1-1 Product components and their descriptions (continued)

Category	Description
	Power cord
	1 m, conventional power cord (C5)
Security	Trusted platform module (fTPM) 2.0, firmware based
	Kensington Nano Security Lock
	Fingerprint reader (select models)
	U2F (Universal 2nd Factor Authentication)
Operating system	**Preinstalled**
	Windows® 10 Home 64
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Single Language
	Windows 10 Home S 64
	Windows 10 Home S 64 Single Language
	Windows 10 Pro 64
	FreeDOS 2.0
Serviceability	**End-user replaceable parts**:
	AC adapter

2 Getting to know your computer

Your computer features top-rated components. This chapter provides details about your components, where they are located, and how they work.

Right side

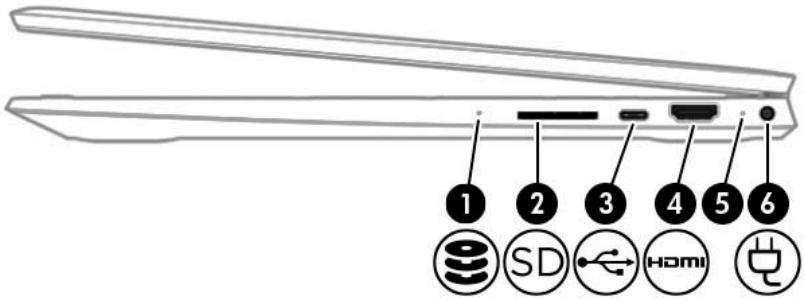


Table 2-1 Right-side components and their descriptions

Component			Description
(1)		Drive light	• Blinking white: The hard drive is being accessed. • Amber (select products only): HP 3D DriveGuard has temporarily parked the hard drive.
(2)	SD	Memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(3)		USB Type-C port	Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer. **NOTE:** Cables and/or adapters (purchased separately) may be required.
(4)	HDMI	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(5)		AC adapter and battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging.

Table 2-1 Right-side components and their descriptions (continued)

Component		Description
		• Off: The battery is not charging.
(6)	Power connector	Connects an AC adapter.

Left side

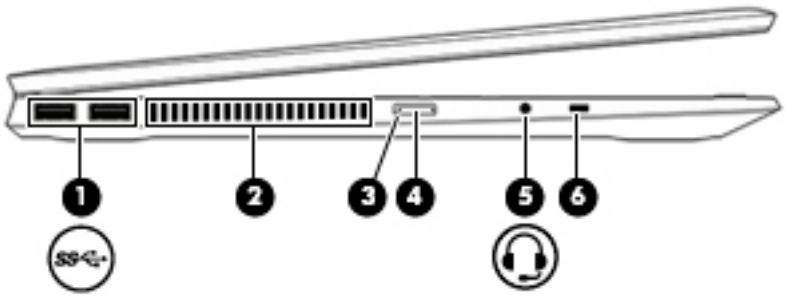


Table 2-2 Left-side components and their descriptions

Component		Description
(1)	USB SuperSpeed ports (2)	Connect USB devices, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
(2)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(4)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). • When the computer is in Hibernation, press the button briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button results in the loss of unsaved information. If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer. To learn more about your power settings, see your power options:

Table 2-2 Left-side components and their descriptions (continued)

Component		Description
		▲ Right-click the **Power** icon , and then select **Power Options**.
(5)	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(6)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Display

Table 2-3 Display components and their descriptions

Component		Description
(1)	Internal microphones (2)	Record sound.
(2)	Camera	Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. **NOTE:** Camera functions vary depending on the camera hardware and software installed on your product.
(3)	Camera light	On: The camera is in use.
(4)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs). **NOTE:** Depending on the model, your computer may have one or two wireless antenna.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**.

Keyboard area

TouchPad

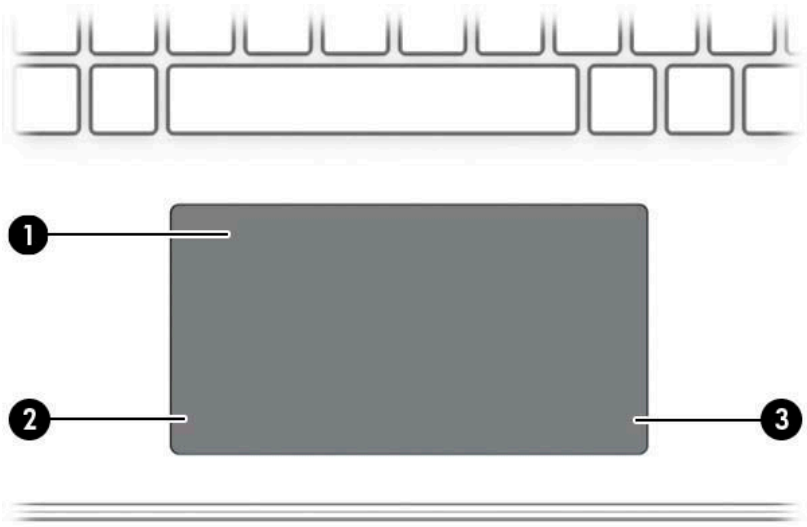


Table 2-4 TouchPad components and their descriptions

Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights

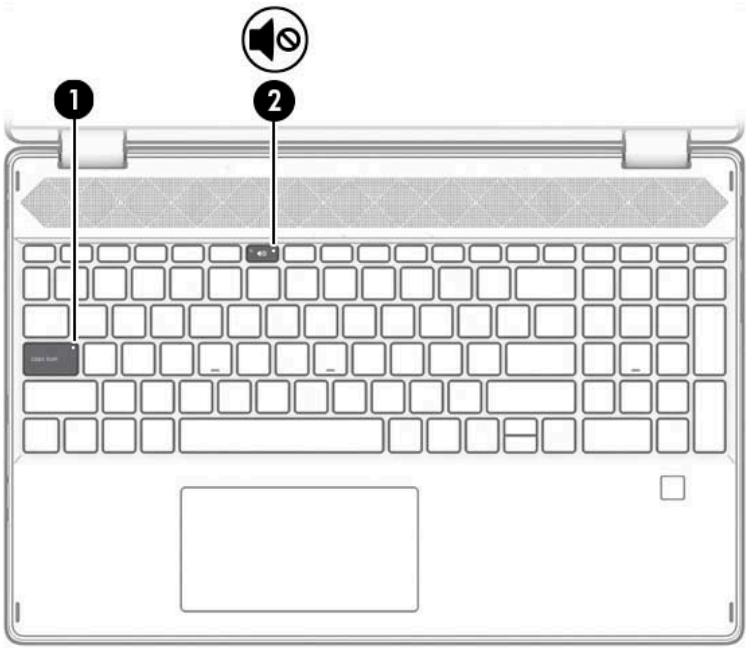


Table 2-5 Lights and their descriptions

Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)	Mute light	• On: Computer sound is off. • Off: Computer sound is on.

Speakers and fingerprint reader

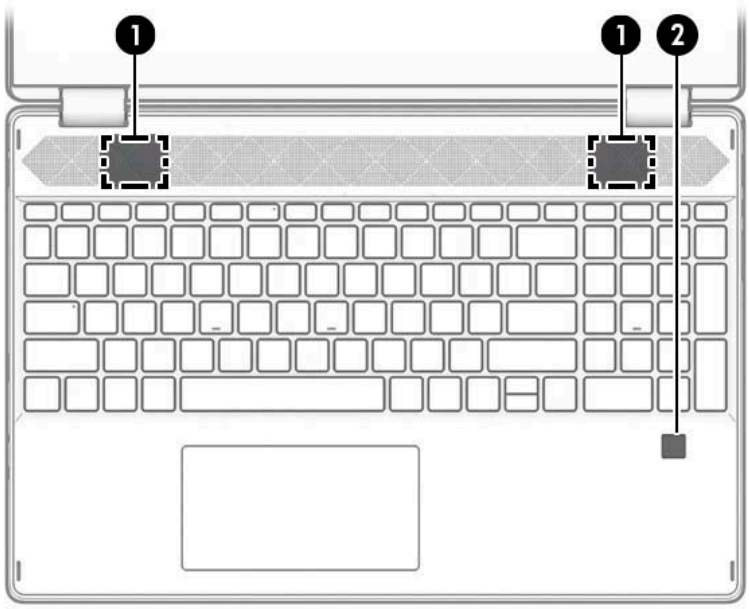


Table 2-6 Speakers and fingerprint reader and their descriptions

Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon. ▲ To use the fingerprint reader, place your finger on the fingerprint reader until it reads your fingerprint. **IMPORTANT:** To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.

Special keys

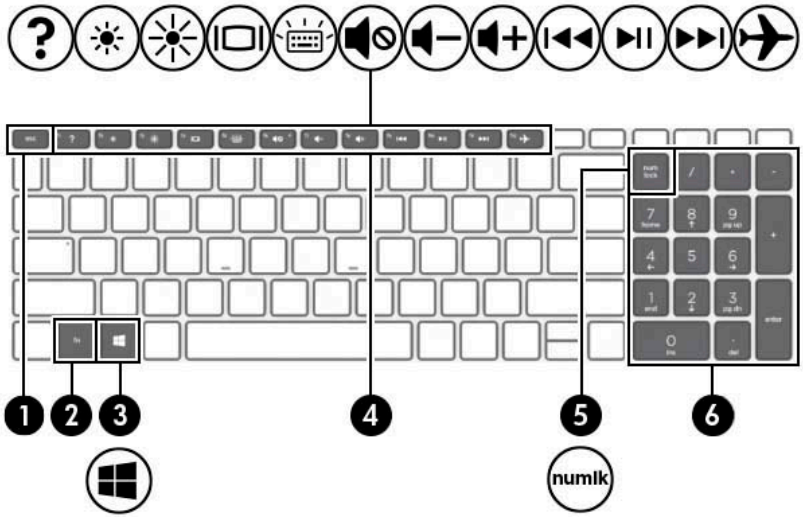


Table 2-7 Special keys and their descriptions

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes specific functions when pressed in combination with another key.
(3)	Windows key	Opens the Start menu. **NOTE:** Pressing the Windows key again will close the Start menu.
(4)	Action keys	Execute frequently used system functions. **NOTE:** On select products, the f5 action key turns the keyboard backlight feature off or on.
(5)	num lock key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	A separate keypad to the right of the alphabet keyboard. When num lock is pressed, the keypad can be used like an external numeric keypad. **NOTE:** If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.

Bottom

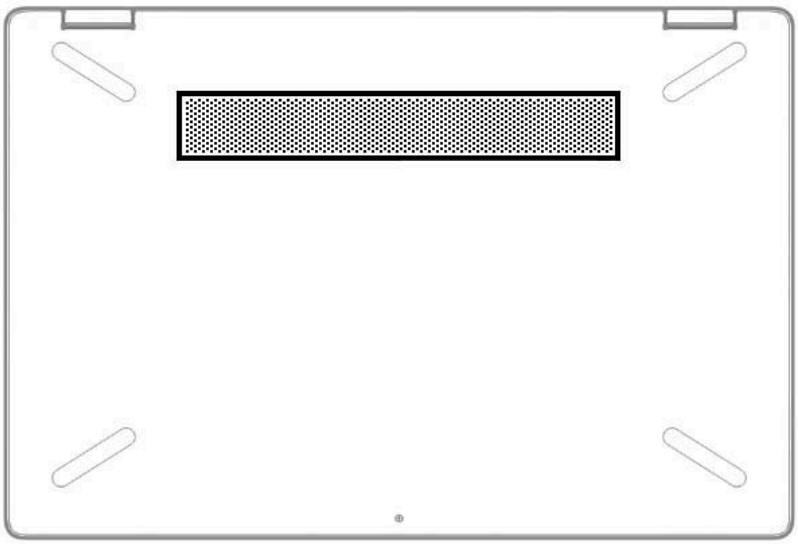


Table 2-8 Bottom components and their descriptions

Component	Description
Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.

IMPORTANT: Check the following locations for the labels described in this section: the bottom of the computer, inside the battery bay, under the service door, on the back of the display, or on the bottom of a tablet kickstand.

- Service label—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.

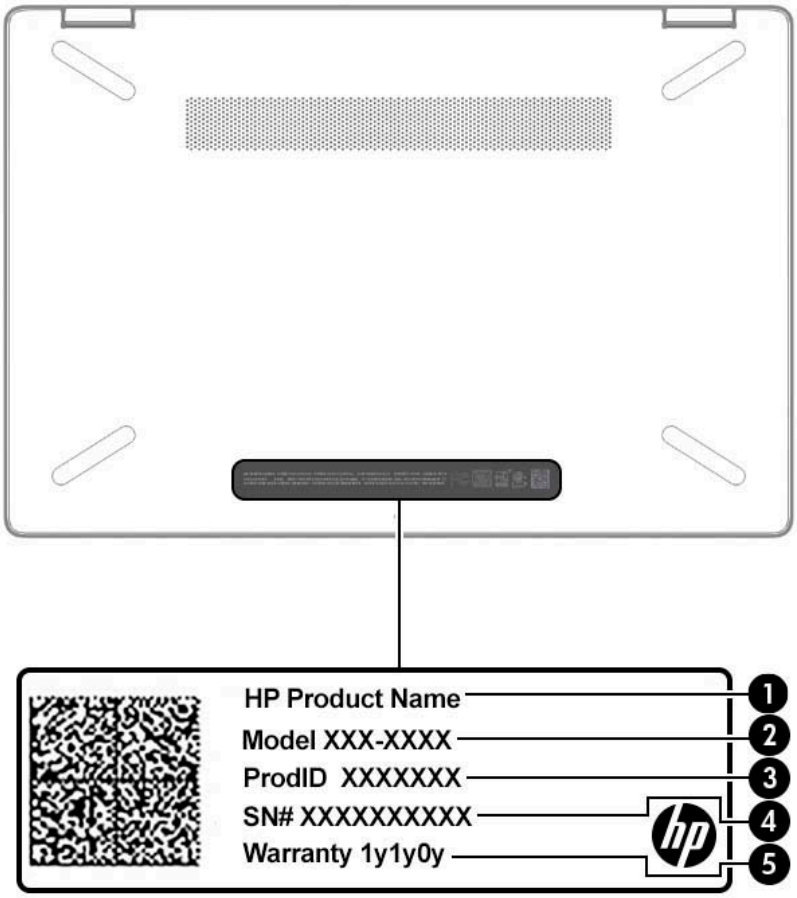


Table 2-9 Service label components

Component	
(1)	Product name
(2)	Model number
(3)	Product ID

Table 2-9 Service label components (continued)

Component	
(4)	Serial number
(5)	Warranty period

- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Computer major components

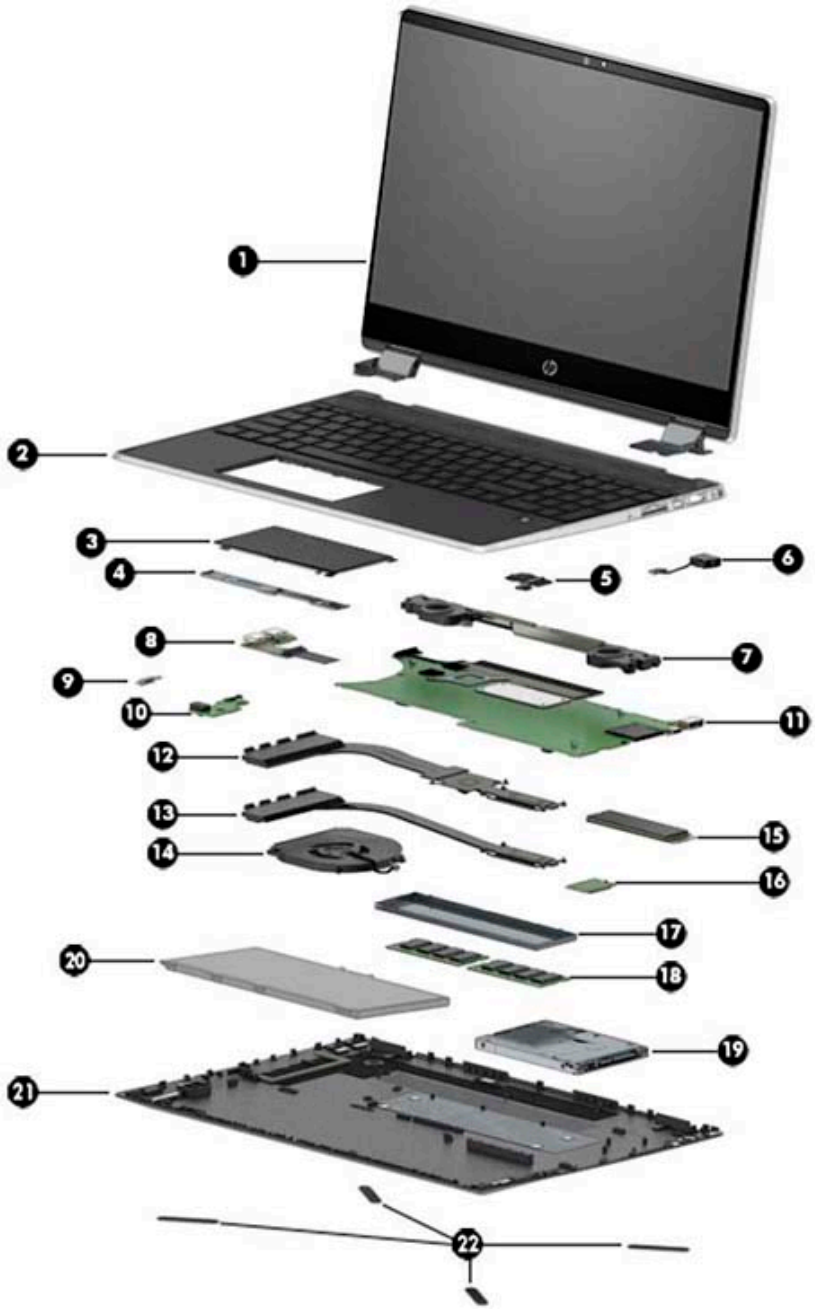


Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	**Display assembly**: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly subcomponents on page 19.	
(2)	**Keyboard/top cover** (includes keyboard cable) For a detailed list of country codes, see Keyboard/top cover on page 68.	
	For use in models with a backlit keyboard:	
	• With fingerprint reader; natural silver	L51519-xx1
	• Without fingerprint reader; natural silver	L51520-xx1
	• With fingerprint reader; pale gold	L51521-xx1
	• Without fingerprint reader; pale gold	L51522-xx1
	For use in models without a backlit keyboard:	
	• With fingerprint reader; natural silver	L51362-xx1
	• Without fingerprint reader; natural silver	L51363-xx1
	• With fingerprint reader; pale gold	L51364-xx1
	• Without fingerprint reader; pale gold	L51365-xx1
(3)	**TouchPad** (includes bracket) **NOTE:** The TouchPad spare part kit does not include the TouchPad cable. The TouchPad cable is available using spare part number L51341-001.	L51336-001
(4)	**TouchPad bracket**	included with TouchPad
(5)	**Fingerprint reader** **NOTE:** The fingerprint reader spare part kit does not include the cable. The cable is available using spare part number L51344-001.	L51113-001
(6)	**Power connector cable**	L51346-001
(7)	**Speakers** (include left and right speakers and cable)	L51355-001
(8)	**USB board** **NOTE:** The USB board spare part kit does not include the cable. The cable is available using spare part number L51345-001.	L51334-001
(9)	**Power button**	
	Pale gold	L54140-001
	Natural silver	L54139-001
(10)	**Power button/audio board** **NOTE:** The power button/audio board spare part kit does not include the cable. The cable is available using spare part number L51342-001.	L51333-001
(11)	**System board** (includes processor)	

Table 3-1 Computer major components and their descriptions (continued)

Item	Component	Spare part number
	NOTE: All system board spare part kits include replacement thermal material. All system boards use the following part numbers: xxxxxx-001: Non-Windows operating systems xxxxxx-601: Windows operating system	
	For use in models with discrete graphics memory:	
	• Intel Core i7-8565U processor and 4 GB Radeon 535 graphics memory	L50975-xx1
	• Intel Core i5-8265U processor and 2 GB Radeon 535 graphics memory	L50974-xx1
	For use in models with UMA graphics memory:	
	• Intel Core i7-8565U processor	L50973-xx1
	• Intel Core i5-8265U processor	L50972-xx1
	• Intel Core i3-8145U processor	L50971-xx1
	Thermal pad, for use in models with discrete graphics memory (not illustrated)	L21302-001
	Heat sink (includes replacement thermal material)	
(12)	For use in models with discrete graphics	L51348-001
(13)	For use in models with UMA graphics	L51347-001
(14)	**Fan**	L51349-001
(15)	**Solid-state drive** (M.2)	
	512 GB, PCIe	L51361-001
	256 GB, PCIe	L51360-001
	128 GB, SATA-3, TLC	L51359-001
	16 GB, PCIe (Optane Memory Module)	L55350-001
(16)	**WLAN module**	
	Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2	924813-855
	Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2	L17365-005
	Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5	L22634-005
(17)	**Memory cover**	L51104-001
(18)	**Memory module** (DDR4)	
	8 GB	937236-855
	4 GB	L10598-855
(19)	**Hard drive**	
	2 TB, 5400 rpm	912487-858
	1 TB, 5400 rpm	L30422-007
	500 GB, 5400 rpm	778186-007
(20)	**Battery** (3-cell, 41 Whr)	L11119-857

Table 3-1 Computer major components and their descriptions (continued)

Item	Component	Spare part number
(21)	**Bottom cover**	
	For use in models with discrete graphics memory	L51338-001
	For use in models with UMA graphics memory	L51339-001
(22)	**Rubber Feet Kit**	L51354-001

Display assembly subcomponents

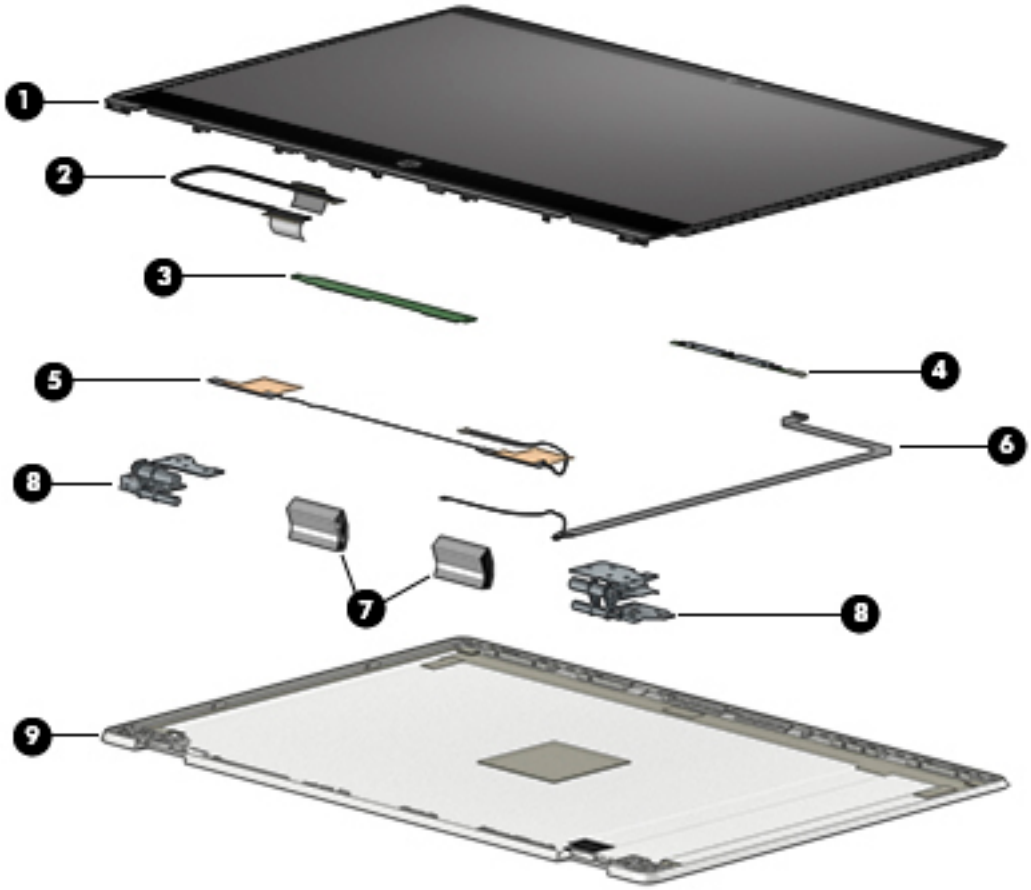


Table 3-2 Display assembly components and their descriptions

Item	Component	Spare part number
(1)	**Display panel**	
	FHD	L51357-001
	HD	L51358-001
(2)	**Display cable**	L51771-001
(3)	**Touch control board**	L51770-001
(4)	**Webcam/microphone module** (includes double-sided adhesive)	L51337-001

Table 3-2 Display assembly components and their descriptions (continued)

Item	Component	Spare part number
(5)	**WLAN antenna**	L51326-001
(6)	**Webcam cable**	L51340-001
(7)	**Display Hinge Kit** (includes left and right display hinges)	
	For use in models with an FHD display panel	L51819-001
	For use in models with an HD display panel	L51331-001
(8)	**Hinge cover**	
	For use in models with an FHD display panel	L51820-001
	For use in models with an HD display panel	L51332-001
(9)	**Display enclosure**	
	For use in models with an HD display	
	• Natural silver	L51327-001
	• Pale gold	L51328-001
	For use in models with an FHD display	
	• Natural silver	L51329-001
	• Pale gold	L51330-001

Mass storage devices

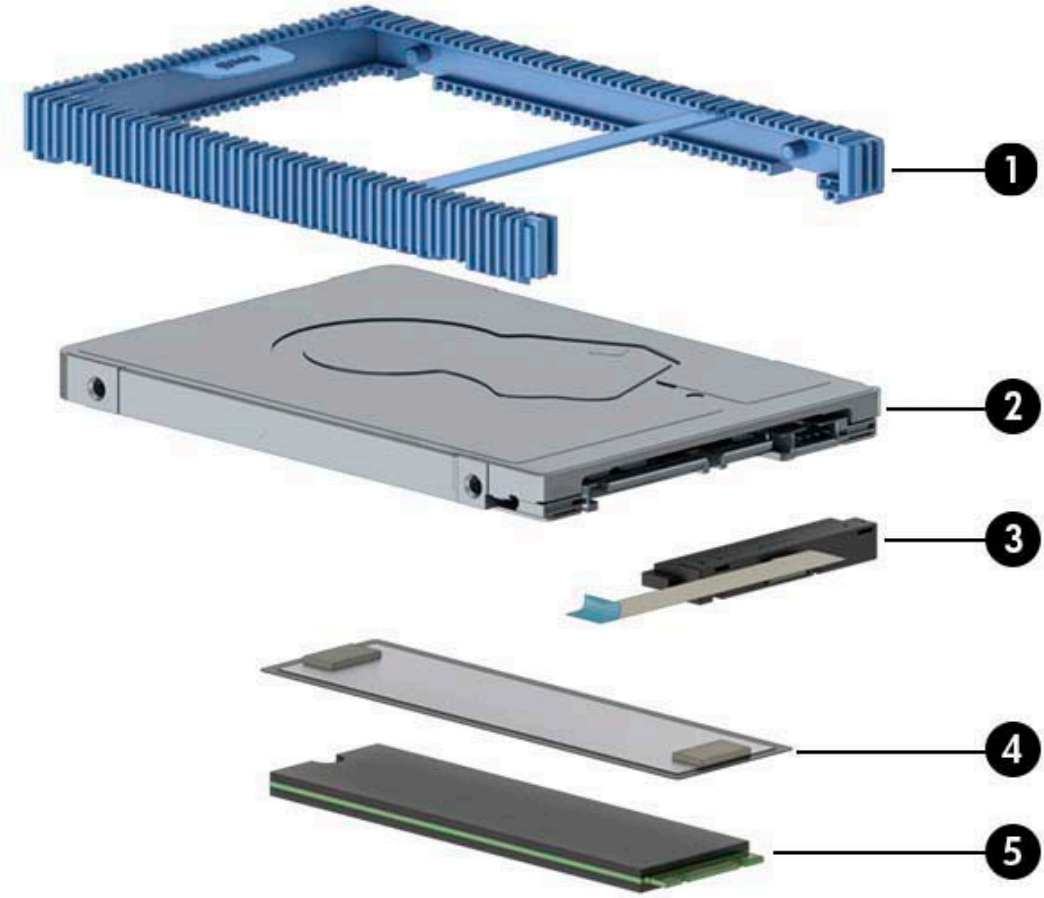


Table 3-3 Mass storage devices and their descriptions

Item	Component	Spare part number
(1)	**Hard drive cover**	L51350-001
(2)	**Hard drive**	
	2 TB, 5400 rpm	912487-858
	1 TB, 5400 rpm	L30422-007
	500 GB, 5400 rpm	778186-007
(3)	**Hard drive cable**	L51343-001
(4)	**Solid-state drive module foil cover**	L51352-001
(5)	**Solid-state drive** (M.2)	
	512 GB, PCIe	L51361-001
	256 GB, PCIe	L51360-001
	128 GB, SATA-3, TLC	L51359-001
	16 GB, PCIe (Optane Memory Module)	L55350-001

Cables

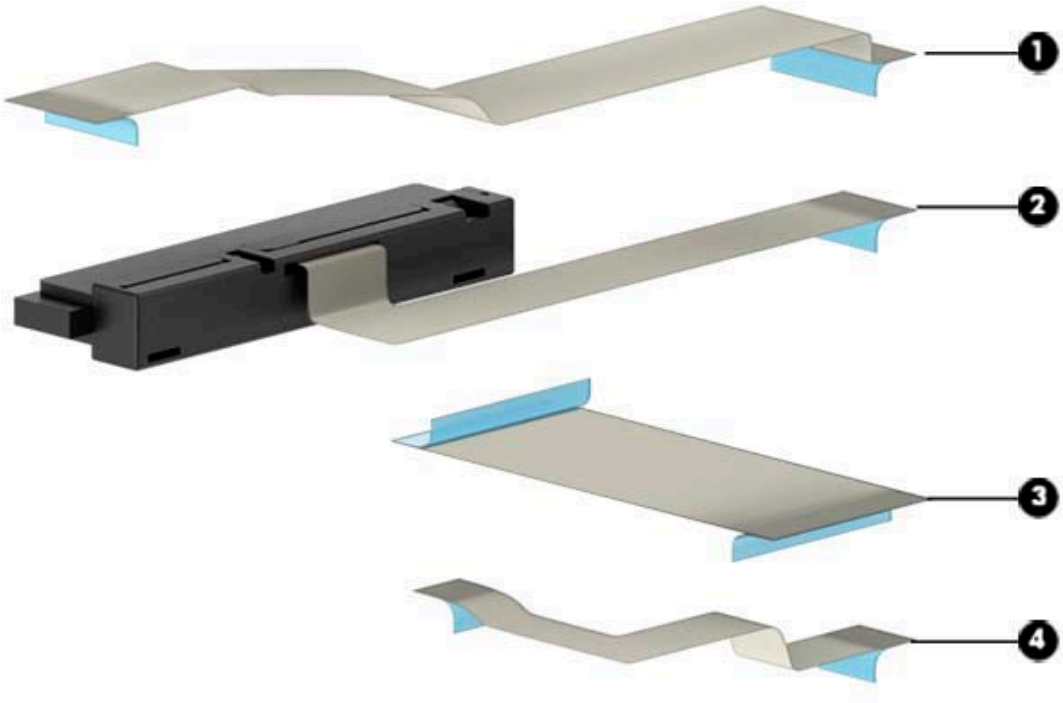


Table 3-4 Cables and their descriptions

Item	Component	Spare part number
(1)	**TouchPad cable**	L51341-001
(2)	**Hard drive cable**	L51343-001
(3)	**USB board cable**	L51345-001
(4)	**Power button/audio board cable**	L51342-001
	Fingerprint reader cable (not illustrated)	L51344-001

Miscellaneous parts

Table 3-5 Miscellaneous parts and their descriptions

Component	Spare part number
65 W AC adapter (non-PFC, S-3P, 4.5 mm)	710412-001
65 W AC adapter (non-PFC, S-3P, 4.5 mm) for use in Argentina	710340-850
45 W HP Smart AC adapter (non-PFC, RC, 4.5 mm, non-slim)	741727-001
45 W HP Smart AC adapter (non-PFC, RC, 4.5 mm) for use in Argentina	741553-852
Power cord, (C5, 1.0 m)	
For use in Denmark	L19360-001
For use in Europe	L19361-001
For use in Israel	L19362-001
For use in Italy	L19364-001
For use in North America	L19367-001
For use in South Africa	L19369-001
For use in Switzerland	L19370-001
For use in the United Kingdom	L19373-001
Miscellaneous kit (includes heat sink Mylar, heat sink gasket, and WLAN module gasket, WLAN Mylar, fingerprint reader tape, and memory cover and heat sink conductive tape)	L51353-001
Stylus, active pen	910942-001
Pen tip	L04536-001
Adapter, USB-C to USB-A	833960-001
HP USB External DVD-RW Drive	747080-001
HP HDMI-to-VGA adapter	701943-001
HP USB-to-Gigabit RJ-45 adapter	829941-001
HP USB-C-to-RJ-45 adapter	855560-001
Screw Kit	L51356-001

4 Removal and replacement procedures preliminary requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Non-marking, non-conductive pry tool
- Magnetic Phillips P1 screwdriver

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

IMPORTANT: Using excessive force during disassembly and reassembly can damage plastic parts.

Cables and connectors

IMPORTANT: When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

IMPORTANT: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing an optical drive, be sure that a disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive or an optical drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.

IMPORTANT: To prevent damage to the device when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

Generating static electricity

Note the following:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

Table 4-1 Static electricity occurrence based on activity and humidity

	Relative humidity		
Event	**55%**	**40%**	**10%**
Walking across carpet	7,500 V	15,000 V	35,000 V
Walking across vinyl floor	3,000 V	5,000 V	12,000 V
Motions of bench worker	400 V	800 V	6,000 V
Removing DIPs from plastic tube	400 V	700 V	2,000 V
Removing DIPs from vinyl tray	2,000 V	4,000 V	11,500 V
Removing DIPs from Styrofoam	3,500 V	5,000 V	14,500 V
Removing bubble pack from PCB	7,000 V	20,000 V	26,500 V
Packing PCBs in foam-lined box	5,000 V	11,000 V	21,000 V
Electronic components are then multi-packaged inside plastic tubes, trays, or Styrofoam.			

NOTE: As little as 700 volts can degrade a product.

Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent static electricity damage to electronic components.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.

- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal grounding methods and equipment

Use the following equipment to prevent static electricity damage to electronic components:

- **Wrist straps** are flexible straps with a maximum of one-megohm ± 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of one-megohm ± 10% resistance between the operator and ground.

Table 4-2 Static shielding protection levels

Static shielding protection levels	
Method	**Voltage**
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the work area

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance
- Static-dissipative table or floor mats with hard tie to ground

- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

5 Removal and replacement procedures for authorized service provider parts

IMPORTANT: Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

There are as many as 52 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

See Removal and replacement procedures preliminary requirements on page 24 for initial safety procedures.

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Bottom cover

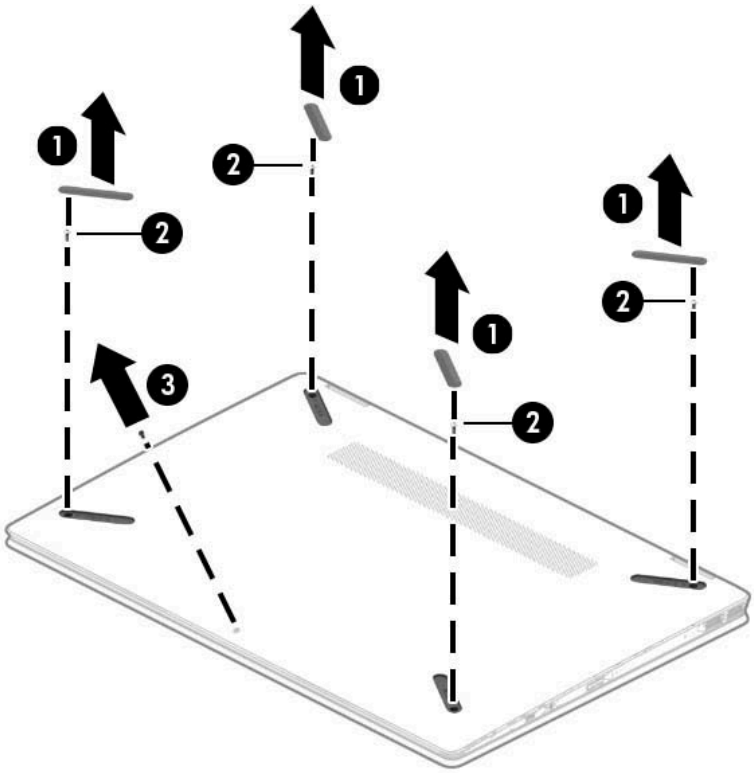
Table 5-1 Bottom cover description and part number

Description	Spare part number
Bottom cover for use in models with discrete graphics memory	L51338-001
Bottom cover for use in models with UMA graphics memory	L51339-001
Rubber Foot Kit	L51354-001

▲ Prepare the computer for disassembly (Preparation for disassembly on page 29).

Remove the bottom cover:

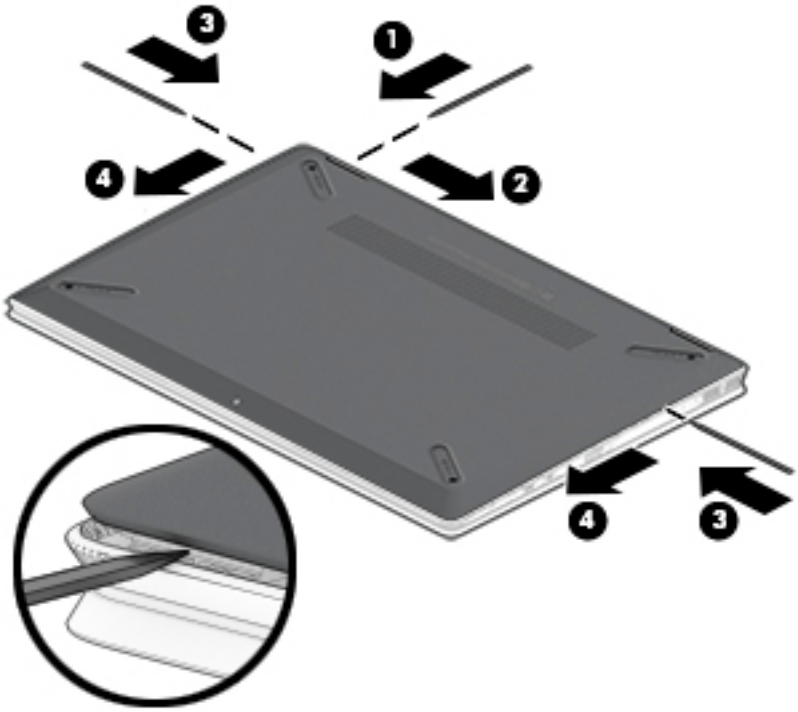
1. Peel the four upper rubber feet off the bottom of the computer **(1)**.
2. Remove the four Phillips M2.0 × 6.0 screws from under the feet **(2)** and the Phillips M2.0 × 4.0 screw from the bottom edge **(3)**.



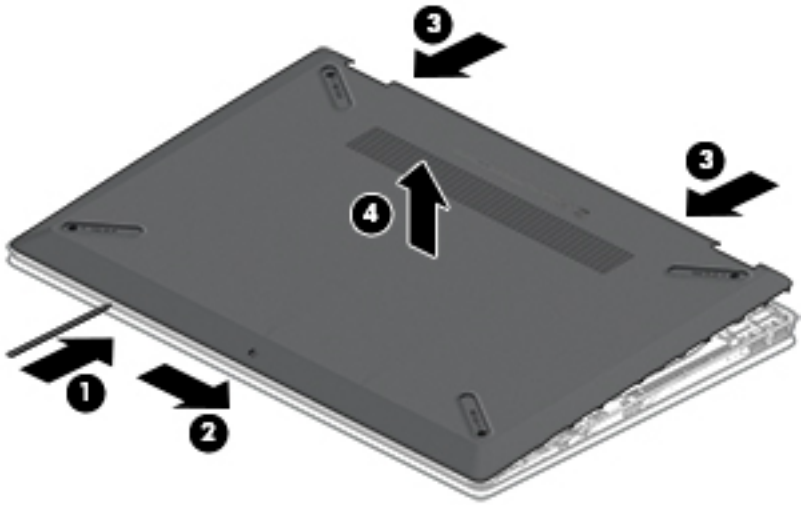
3. On the side of the computer with the display, insert a plastic tool between the bottom cover and the computer **(1)**, and then slide the tool from one side of the computer to the other **(2)** to separate the bottom cover from the computer.

4. On the left and right sides of the computer, insert a plastic tool between the bottom cover and the computer **(3)**, and then slide the tool from the top to the bottom of the computer **(4)** to separate the bottom cover from the computer.

IMPORTANT: Be sure to follow the removal instructions to avoid damaging the hooks on the inside of the bottom cover and computer.



5. On the bottom edge of the computer, insert a plastic tool between the bottom cover and the computer **(1)**, and then slide the tool from one side of the computer to the other **(2)** to separate the bottom cover from the computer. At the same time, push downward on the top edge of the bottom cover **(3)**, and then lift the bottom cover off the computer **(4)**.



Reverse this procedure to install the bottom cover.

Battery

Table 5-2 Battery description and part number

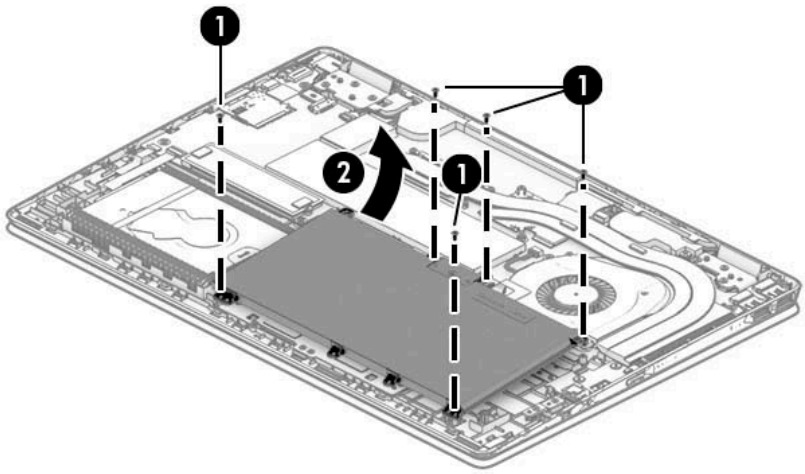
Description	Spare part number
Battery (3-cell, 41 Whr)	L11119-857

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).

Remove the battery:

1. Remove the five Phillips M2.0 × 3.0 screws **(1)** that secure the battery to the computer.
2. Remove the battery from the computer **(2)**.



Reverse this procedure to install the battery.

WLAN module

Table 5-3 WLAN module description and part number

Description	Spare part number
Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2	L17365-005
Realtek RTL8822BE 802.11ac 2 × 2 Wi-Fi + Bluetooth 4.2	924813-855
Intel Wireless-AC 9560 802.11ac 2 × 2 Wi-Fi + Bluetooth 5	L22634-005
WLAN module gasket (included in Miscellaneous kit)	L51353-001

CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Disconnect the battery (see Battery on page 32).

Remove the WLAN module:

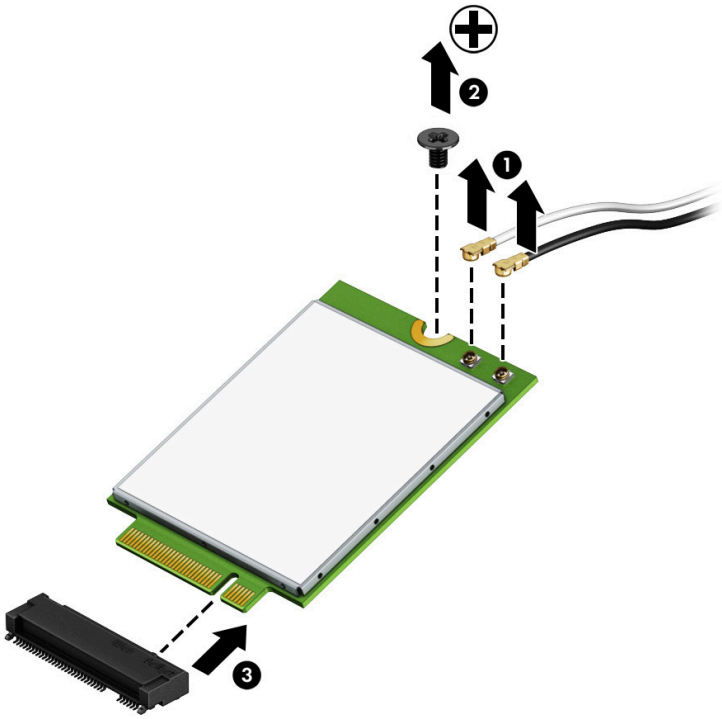
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: Models have either one or two WLAN antennas. On models with two antennas, the #1/white WLAN antenna cable connects to the WLAN module #1/Main terminal. The #2/black WLAN antenna cable connects to the WLAN module #1/Aux terminal.

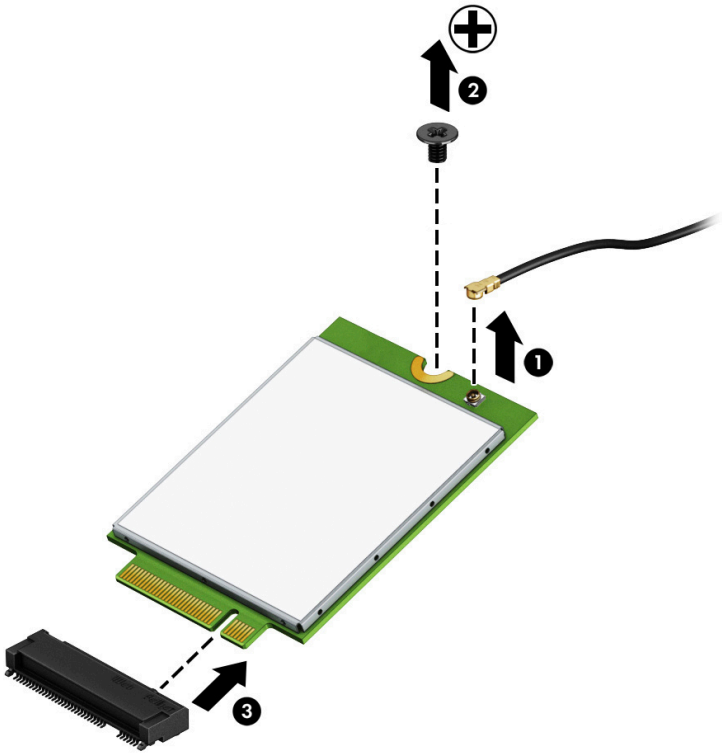
2. Remove the Phillips M2.0 × 2.5 screw **(2)** that secures the WLAN module to the bottom cover. (The WLAN module tilts up.)

3. Remove the WLAN module **(3)** by pulling the module away from the slot at an angle.

Models with two antennas



Models with one antenna



NOTE: If the WLAN antenna is not connected to the terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.

Reverse this procedure to install the WLAN module.

Hard drive

Table 5-4 Hard drive description and part number

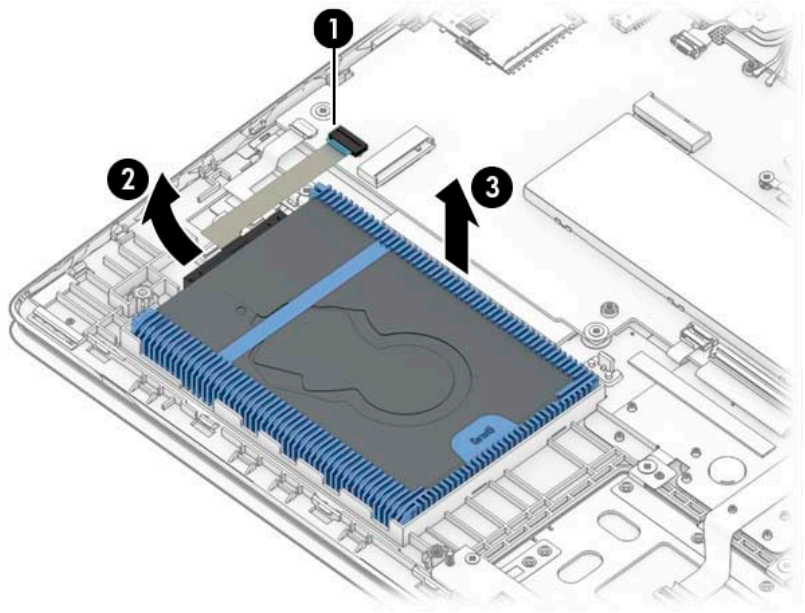
Description	Spare part number
Hard drive, 2 TB, 5400 rpm	912487-858
Hard drive, 1 TB, 5400 rpm	L30422-007
Hard drive, 500 GB, 5400 rpm	778186-007
Hard drive cover	L51350-001

Before removing the hard drive, follow these steps:

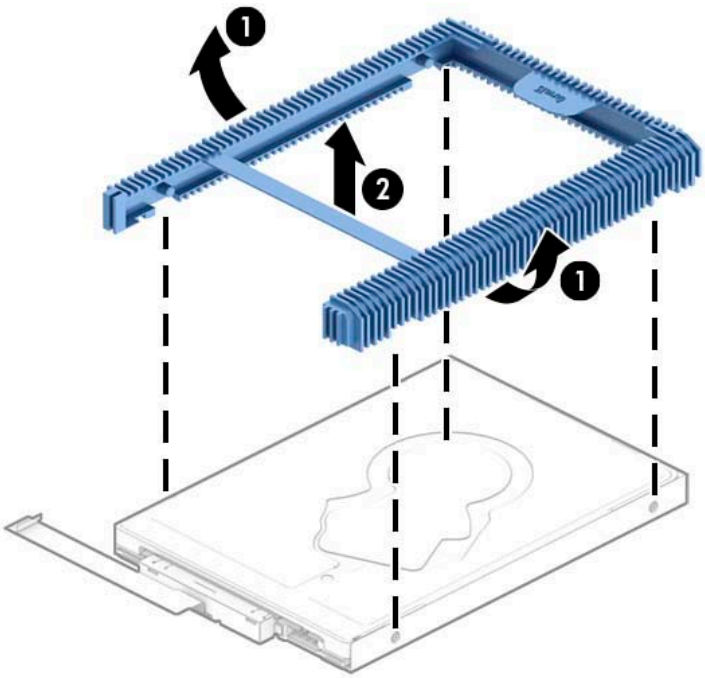
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Disconnect the battery (see Battery on page 32).

Remove the hard drive:

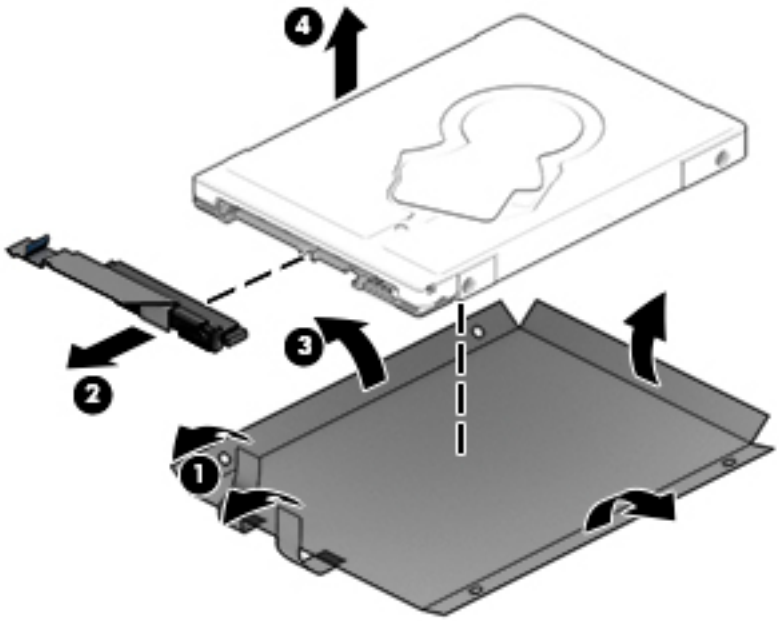
1. Disconnect the hard drive cable from the system board ZIF connector **(1)**.
2. Lift up the connector side of the hard drive **(2)**, and then remove the hard drive from the computer **(3)**.



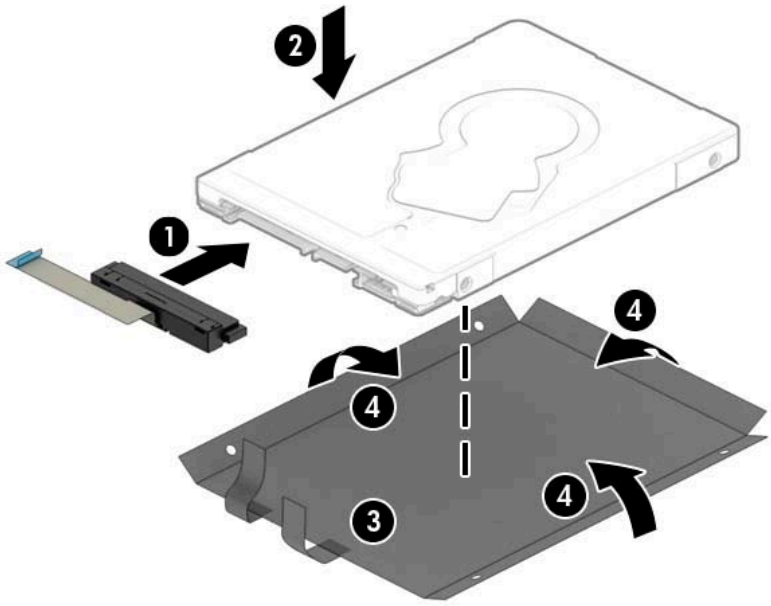
3. If it is necessary to remove the rubber hard drive cover, pull the sides of the cover outward **(1)**, and then remove the cover from the hard drive **(2)**.



4. If it is necessary to remove the foil from the hard drive, lift the two foil tabs from atop connector **(1)**, disconnect the connector from the rear of the drive **(2)**, pull to disengage the sides of the foil **(3)**, and then remove the hard drive from the foil **(4)**.



5. If it is necessary to install foil onto the hard drive, insert the connector onto the rear of the drive **(1)**, center the hard drive onto the foil **(2)**, place the foil tabs over the connector **(3)**, and then adhere the sides of foil onto the sides of the hard drive **(4)**.



Reverse this procedure to reassemble and install the hard drive.

Solid-state drive

Table 5-5 Solid-state drive description and part number

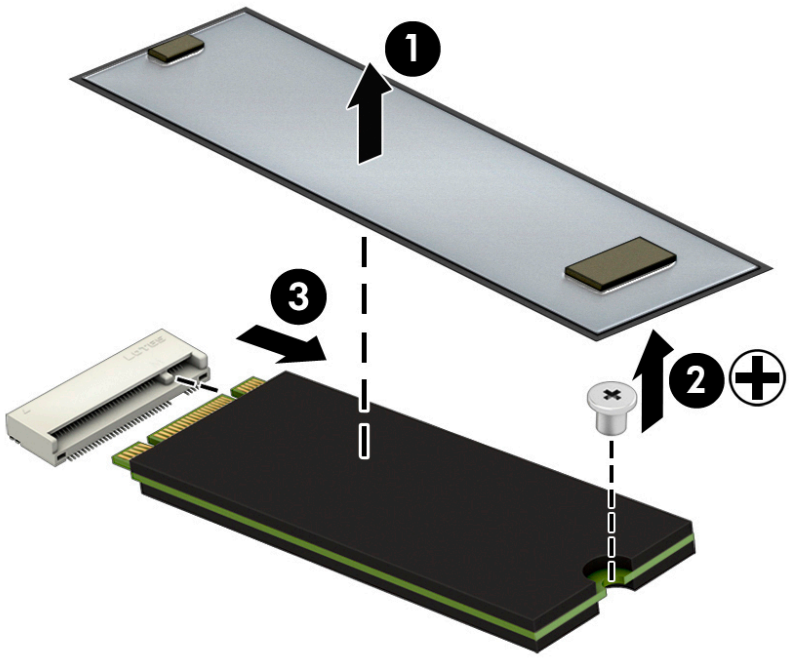
Description	Spare part number
512 GB, PCIe	L51361-001
256 GB, PCIe	L51360-001
128 GB, SATA-3, TLC	L51359-001
16 GB, PCIe (Optane Memory Module)	L55350-001
Solid-state drive module foil cover	L51352-001

Before removing the solid-state drive, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

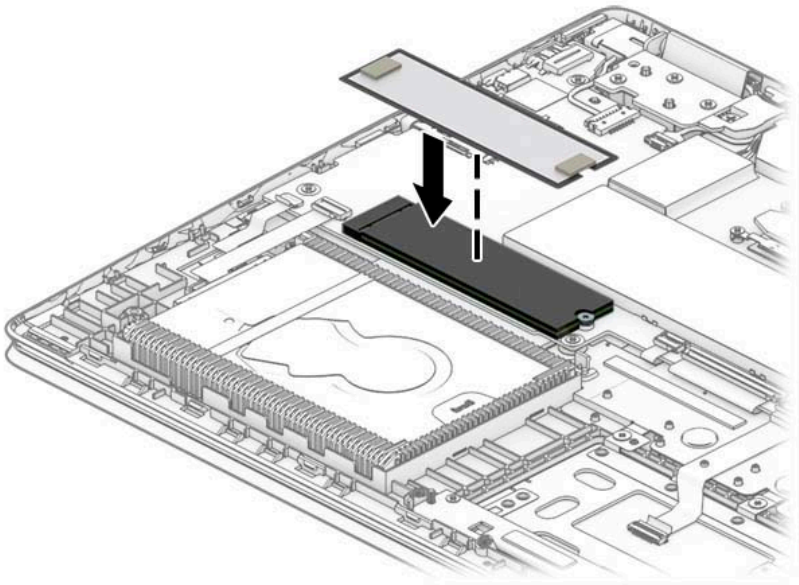
Remove the solid-state drive:

1. Remove the cover from atop the drive **(1)**.
2. Remove the Phillips M2.0 × 3.0 screw **(2)**, and then pull the solid-state drive module from the socket **(3)**.



Reverse this procedure to install the solid-state drive.

When installing a solid-state drive, be sure to place the cover on top of the drive.



Memory

Table 5-6 Memory description and part number

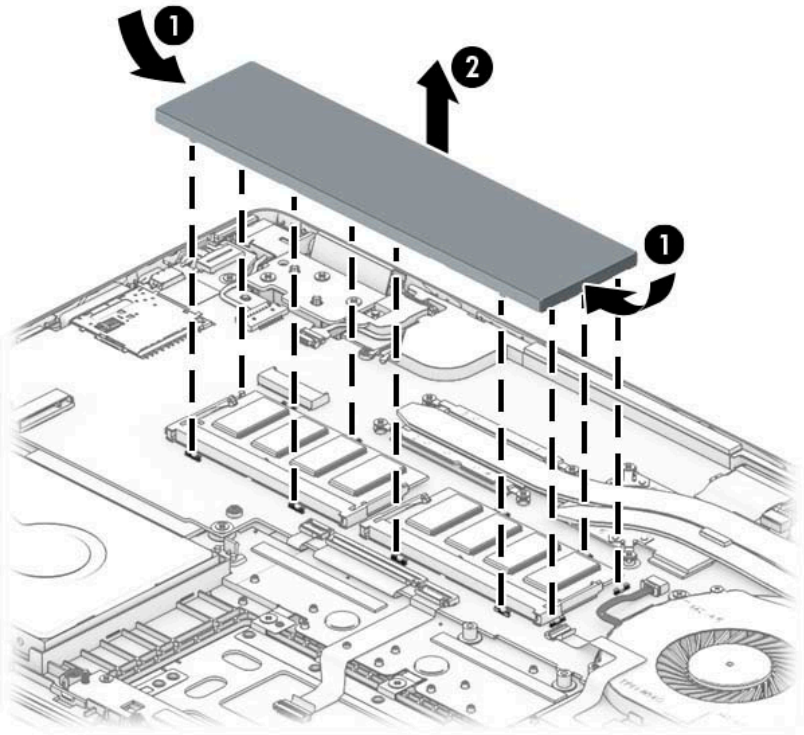
Description	Spare part number
Memory module, 8 GB	937236-855
Memory module, 4 GB	L10598-855
Memory cover	L51104-001

Before removing the memory modules, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

Remove the memory modules:

1. Squeeze the ends of the memory cover **(1)**, and then lift the cover off the system board **(2)**.

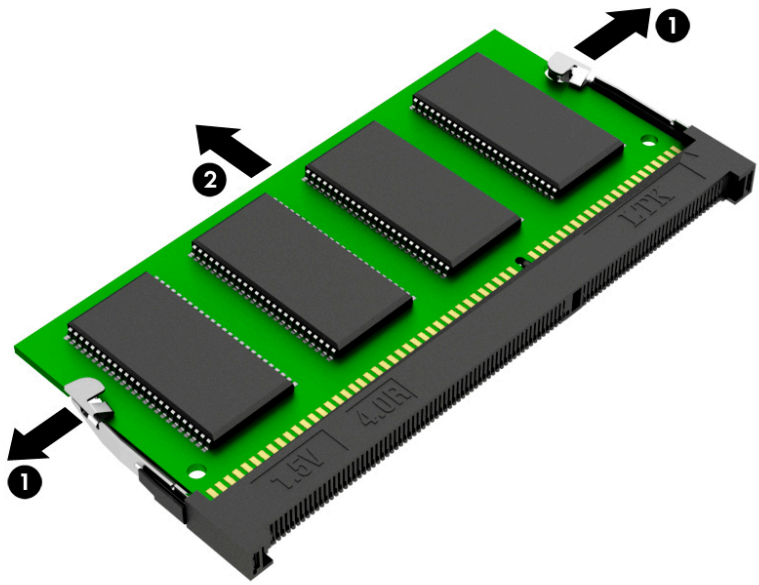


2. Spread the two retention clips outward **(1)** until the memory module tilts up at a 45-degree angle.

3. Grasp the edge of the memory module **(2)**, and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

CAUTION: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

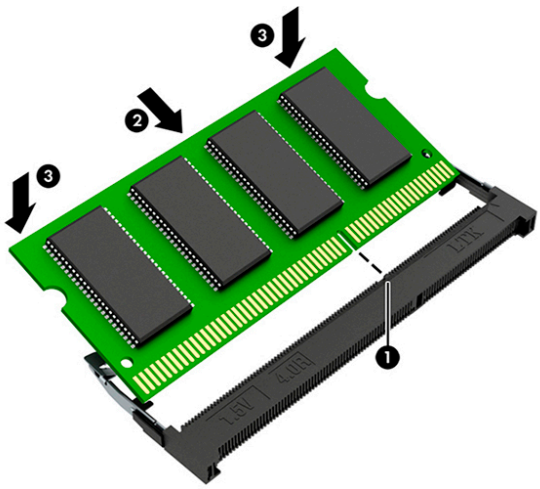
To protect a memory module after removal, place it in an electrostatic-safe container.



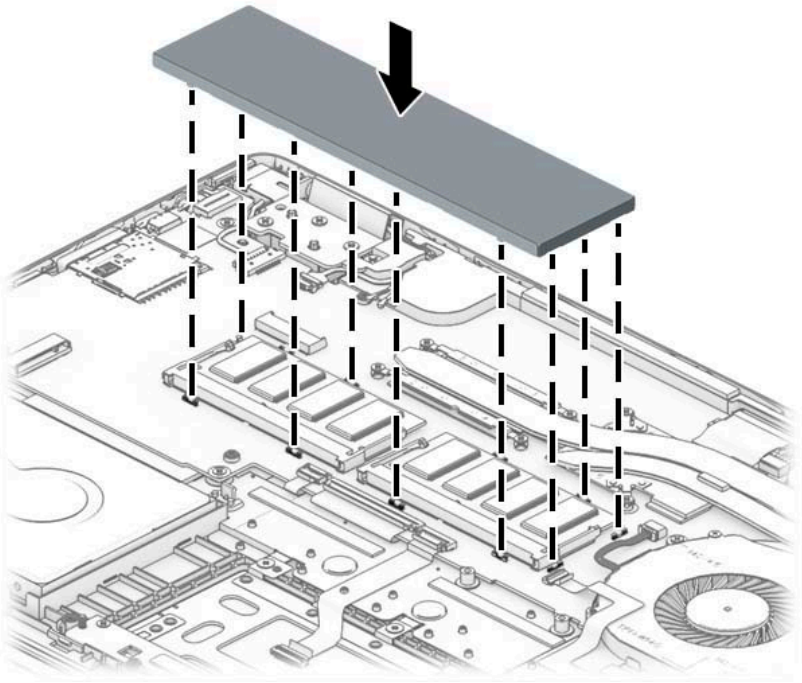
Install the memory modules:

IMPORTANT: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module. Do not bend the memory module.

1. Align the notched edge of the memory module with the tab in the memory module slot **(1)**.
2. Press the module into the slot until seated **(2)**.
3. Gently press down on the module edges until the side retention clips snap into place **(3)**.



To replace the memory cover, insert the edges to the cover into the clips on the system board.



Power button/audio board

NOTE: The power button/audio board spare part kit does not include the power button board cable. The power button/audio board cable is available using spare part number L51342-001.

Table 5-7 Power button/audio board description and part number

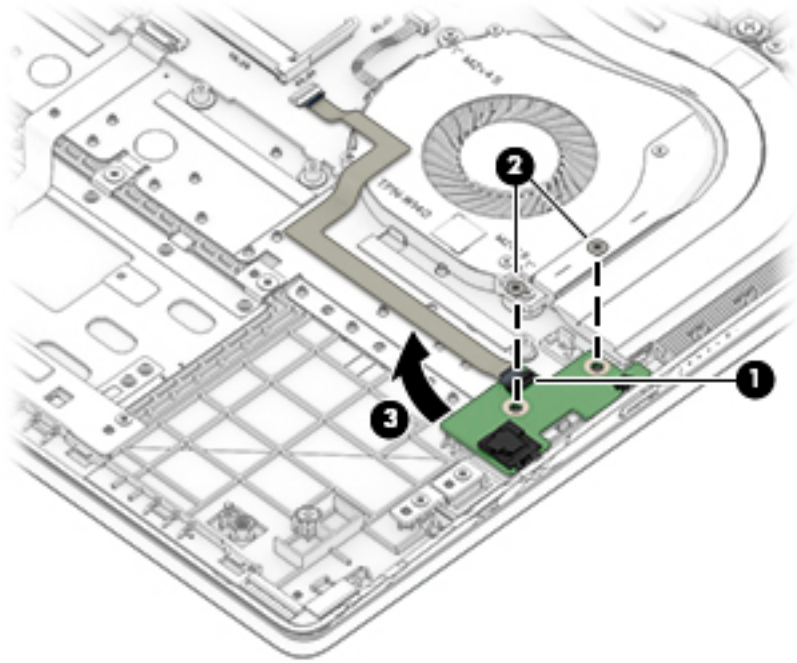
Description	Spare part number
Power button/audio board	L51333-001

Before removing the power button/audio board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

Remove the power button board:

1. Disconnect the cable from the ZIF connector on the board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)** that secure the board to the computer.
3. Rotate the rear of the board up, and then lift it out of the computer **(3)**.



Reverse this procedure to install the power button/audio board.

Power button

Table 5-8 Spare part description and number

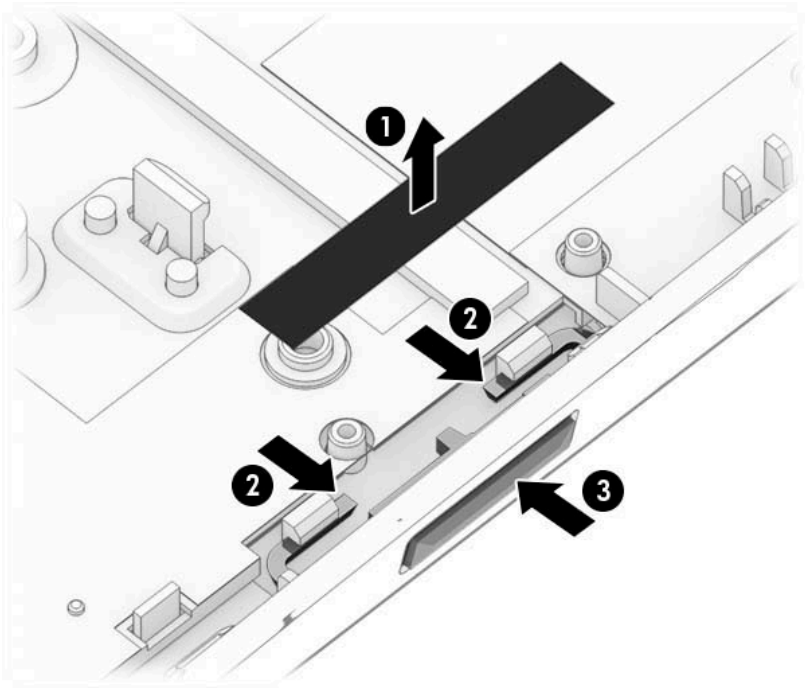
Description	Spare part number
Power button, pale gold	L54140-001
Power button, natural silver	L54139-001

Before removing the power button, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the power button board (see Power button/audio board on page 44).

Remove the power button:

1. Lift the Mylar from on top of the power button **(1)**.
2. Push the tabs that secure the power button to the computer **(2)**.
3. Push the power button into the computer **(3)**.



Reverse this procedure to install the power button.

Fingerprint reader board

NOTE: The fingerprint reader board spare part kit does not include the cable. The board cable is available using spare part number L51344-001.

Table 5-9 Fingerprint reader board description and part number

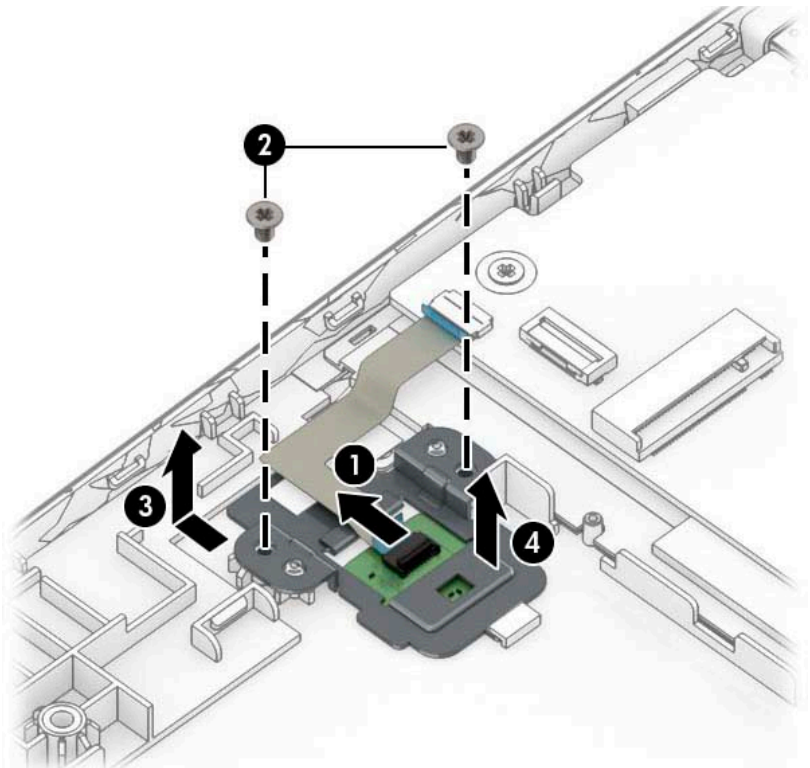
Description	Spare part number
Fingerprint reader board	L51113-001

Before removing the fingerprint reader board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the hard drive (see Hard drive on page 36).

Remove the fingerprint reader board:

1. Disconnect the cable from the reverse ZIF connector on the fingerprint reader board **(1)**.
2. Remove the two Phillips M2.0 × 2.0 screws **(2)** that secure the fingerprint reader board bracket to the computer.
3. Slide the bracket toward the side of the computer, and then remove it **(3)**.
4. Remove the fingerprint reader board from the computer **(4)**.



Reverse this procedure to install the fingerprint reader board.

TouchPad

NOTE: The TouchPad spare part kit does not include the TouchPad cable. The TouchPad cable is available using spare part number L51341-001.

Table 5-10 TouchPad description and part number

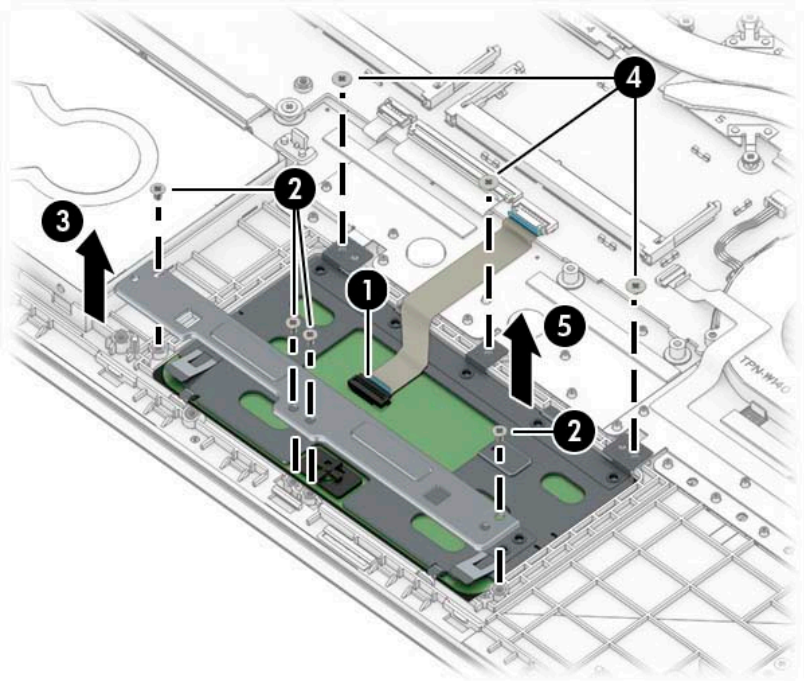
Description	Spare part number
TouchPad	L51336-001

Before removing the TouchPad , follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

Remove the TouchPad:

1. Disconnect the cable from the ZIF connector on the TouchPad **(1)**.
2. Remove the four Phillips M2.0 × 3.0 screws **(2)** that secure the TouchPad bracket to the top cover.
3. Remove the TouchPad bracket from the computer **(3)**.
4. Remove the three broadhead Phillips M2.0 × 2.0 screws **(4)** that secure the TouchPad to the top cover.
5. Remove the TouchPad from the computer **(5)**.



Reverse this procedure to install the TouchPad.

Speakers

Table 5-11 Speaker description and part number

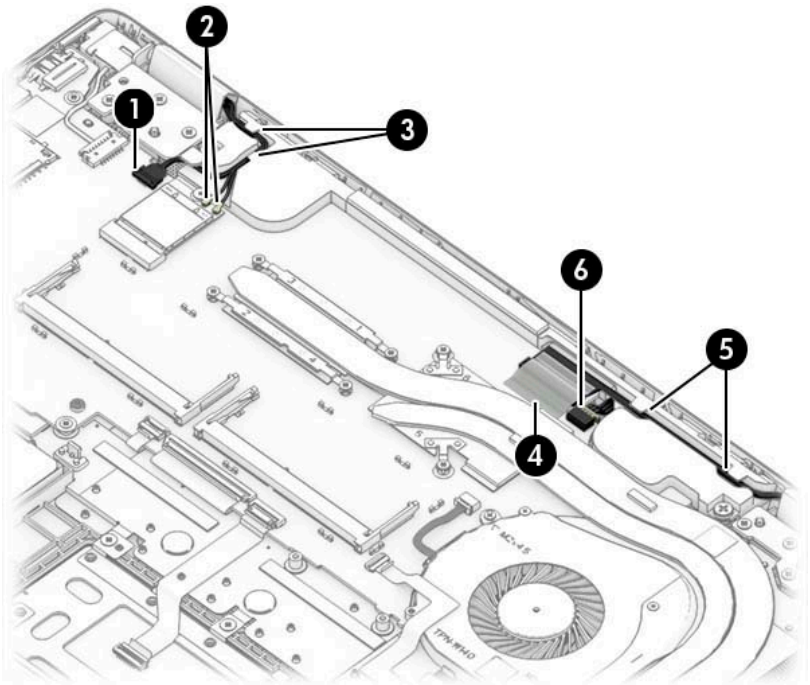
Description	Spare part number
Speakers (includes left and right speakers and cables)	L51355-001

Before removing the speakers, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

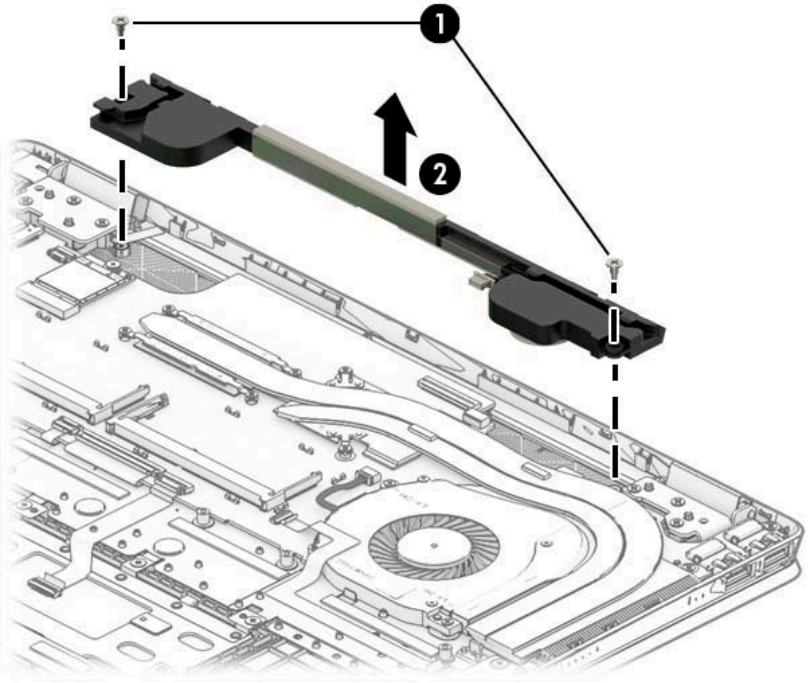
Remove the speakers:

1. Disconnect the speaker cable from the system board **(1)**.
2. Disconnect the antenna cable from the WLAN module **(2)**.
3. Release the cables from the routing over the speaker **(3)**.
4. Disconnect the display cable from the system board **(4)**.
5. Remove the display cable from the routing over the speaker **(5)**.
6. Disconnect the CCD (webcam) cable from the system board **(6)**.



7. Remove the two Phillips M2.0 × 6.0 screws that secure the speaker to the computer **(1)**.

8. Remove the speakers from the computer **(2)**.



Reverse this procedure to install the speakers.

Heat sink

Table 5-12 Heat sink description and part number

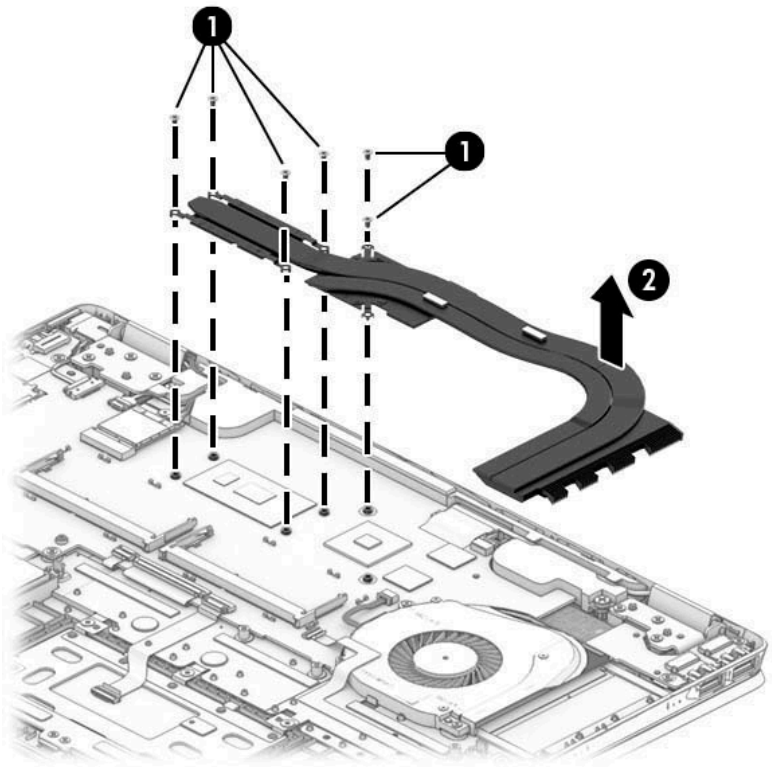
Description	Spare part number
Heat sink for use in models with UMA graphics	L51347-001
Heat sink for use in models with discrete graphics	L51348-001
Miscellaneous kit (includes heat sink Mylar, heat sink gasket, and WLAN module gasket, WLAN Mylar, fingerprint reader tape, and memory cover and heat sink conductive tape)	L51353-001

Before removing the heat sink, follow these steps:

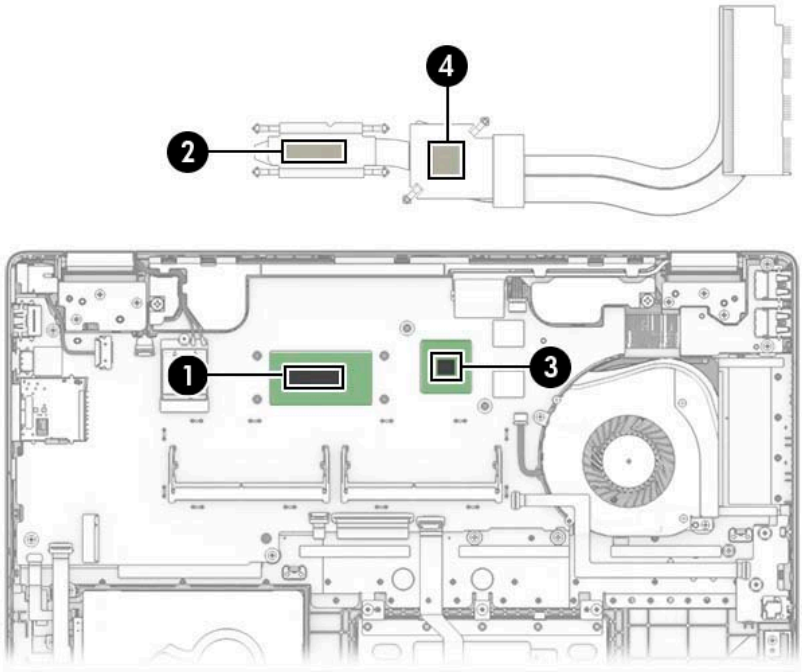
1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

Remove the heat sink from models with discrete graphics:

1. Remove the six Phillips M2.0 × 4.0 screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink **(2)**.

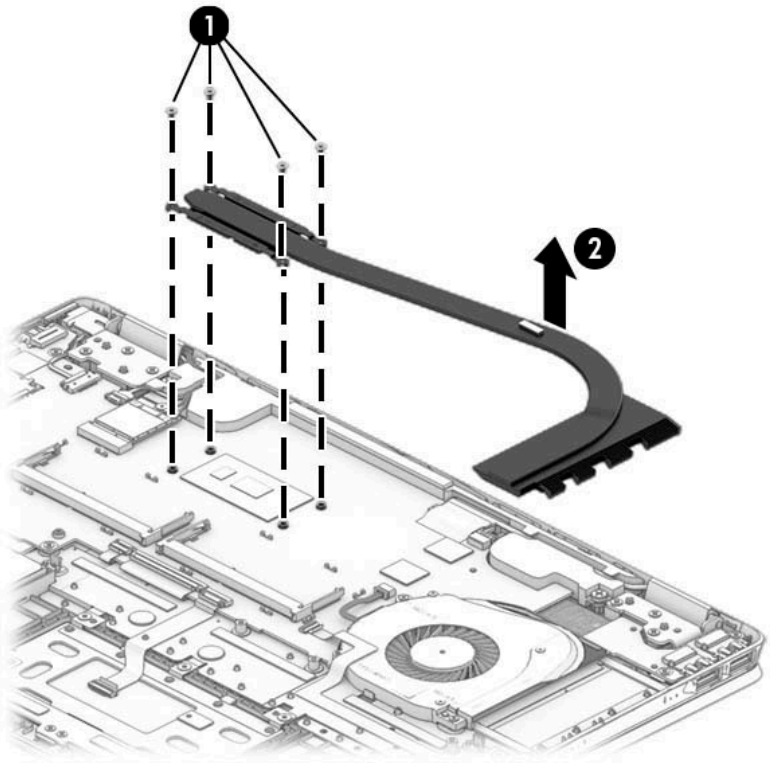


3. Clean and reapply thermal material from the surfaces of the system board components **(1) (3)** and the heat sink **(2) (4)** each time the heat sink is removed.

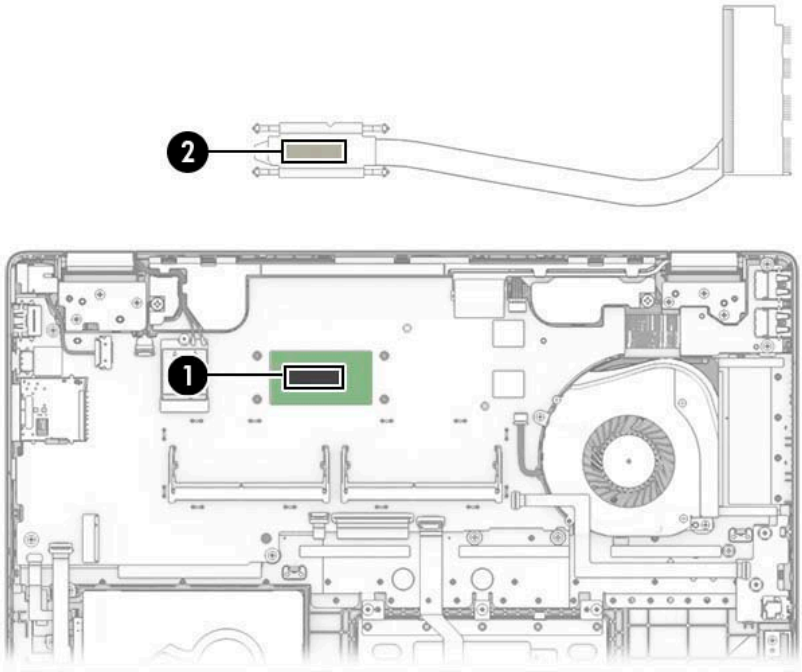


Remove the heat sink from models with integrated UMA graphics:

1. Remove the four Phillips M2.0 × 4.0 screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink **(2)**.



3. Clean and reapply thermal material from the surfaces of the system board component **(1)** and the heat sink **(2)** each time the heat sink is removed.



Reverse this procedure to install the heat sink.

Fan

Table 5-13 Fan description and part number

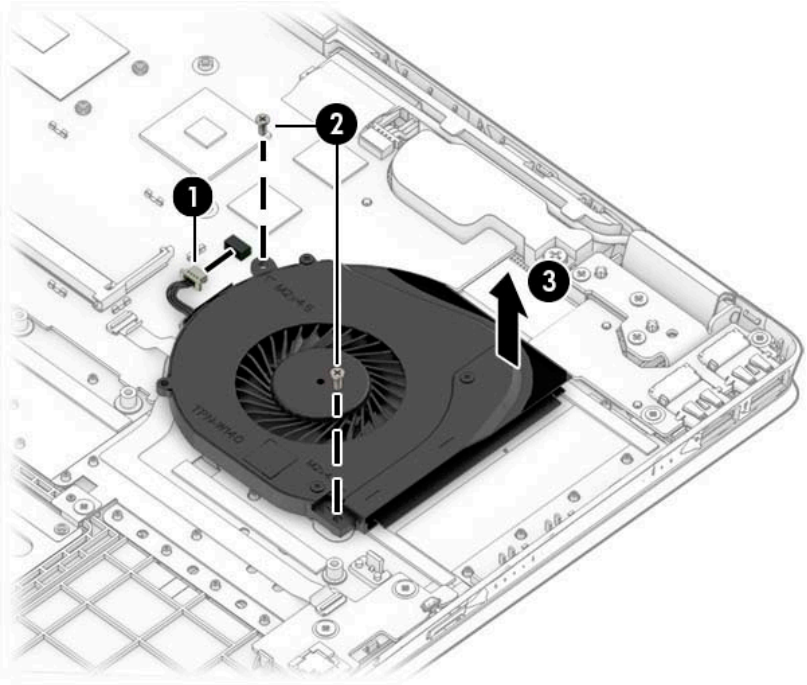
Description	Spare part number
Fan	L51349-001

Before removing the fan, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the heat sink (see Heat sink on page 50).

Remove the fan:

1. Disconnect the fan cable from the system board **(1)**.
2. Remove the two Phillips M2.0 × 4.0 screws **(2)** that secure the fan to the computer.
3. Remove the fan from the computer **(3)**.



Reverse this procedure to install the fan.

USB board

NOTE: The USB board spare part kit does not include the cable. The cable is available using spare part number L51345-001.

Table 5-14 USB board description and part number

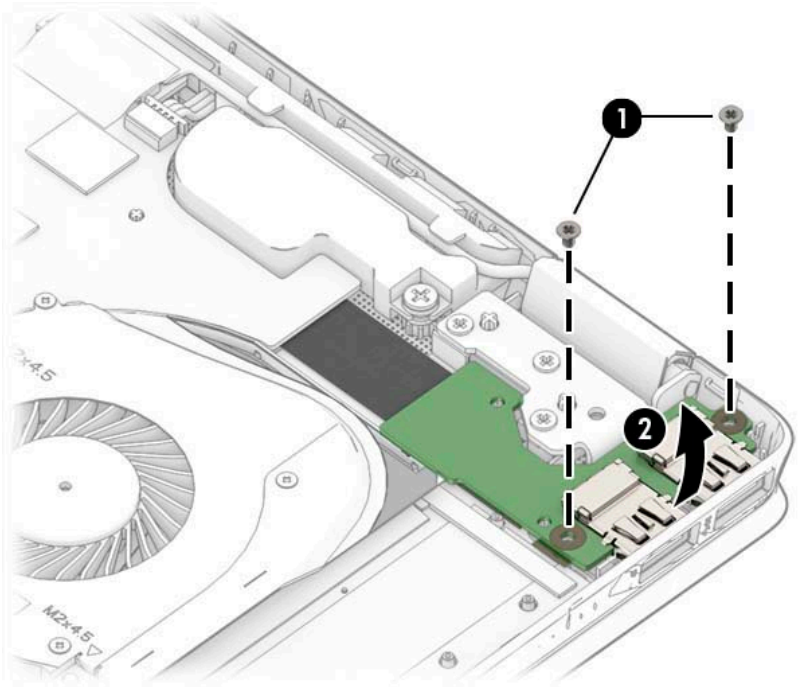
Description	Spare part number
USB board	L51334-001

Before removing the USB board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Disconnect the battery (see Battery on page 32).

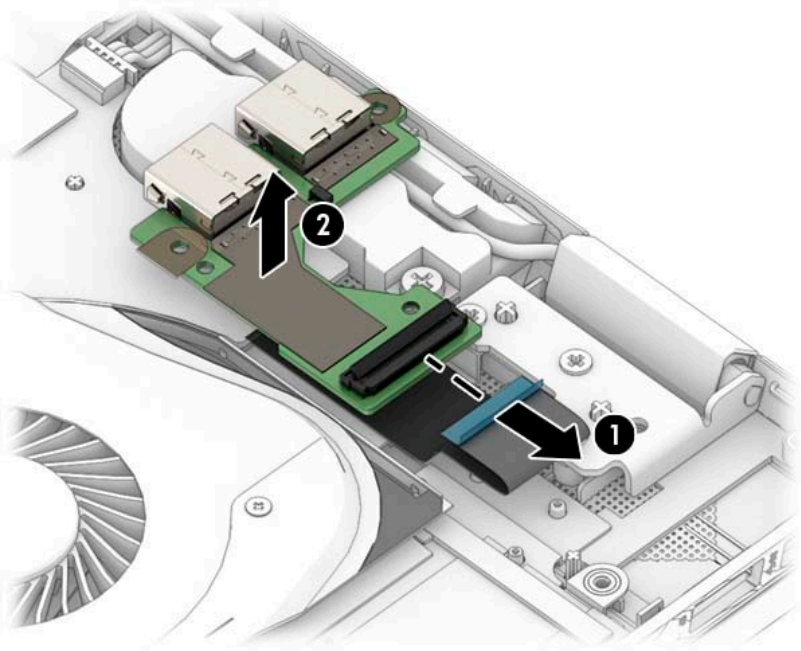
Remove the USB board

1. Remove the two Phillips M2.0 × 3.0 screws **(1)** that secure the board to the computer.
2. Turn the board upside down to access the connector underneath **(2)**.



3. Disconnect the cable from the ZIF connector on the USB board **(1)**.

4. Remove the board from the computer **(2)**.



Reverse this procedure to install the USB board

System board

NOTE: All system board spare part kits include replacement thermal material.

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating systems

xxxxxx-601: Windows operating system

Table 5-15 System board description and part number

Description	Spare part number
System board for use in models with discrete graphics memory:	
• Intel Core i7-8565U processor and 4 GB Radeon 535 graphics memory	L50975-xx1
• Intel Core i5-8265U processor and 2 GB Radeon 535 graphics memory	L50974-xx1
System board for use in models with UMA graphics memory:	
• Intel Core i7-8565U processor	L50973-xx1
• Intel Core i5-8265U processor	L50972-xx1
• Intel Core i3-8145U processor	L50971-xx1
Thermal pad, for use in models with discrete graphics memory	L21302-001

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the WLAN module (see WLAN module on page 33).
5. Remove the solid-state drive (see Solid-state drive on page 39).
6. Remove the USB board (see USB board on page 54).

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) Power connector cable

   (2) Speaker cable

   (3) WLAN module antennas

   (4) Display cable (ZIF)

   (5) Webcam (CCD) cable (ZIF)

   (6) Power button/audio board cable (ZIF)

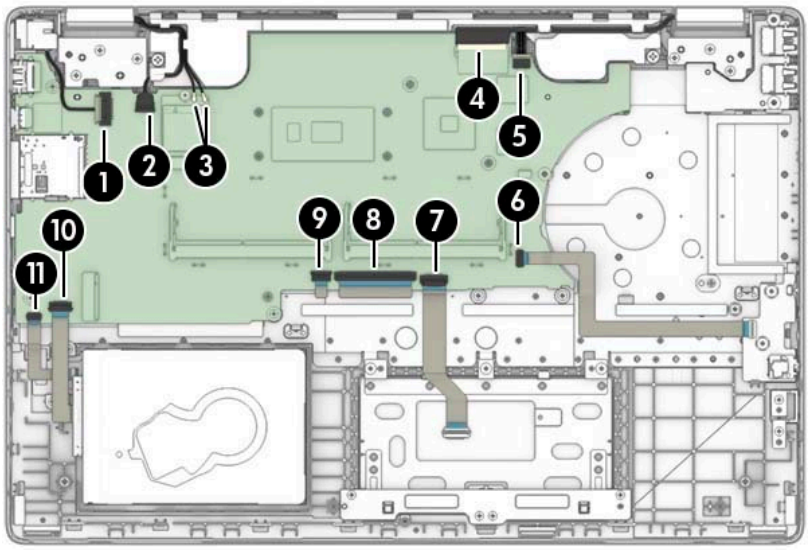
   (7) TouchPad cable from TouchPad (ZIF)

   (8) Keyboard cable (ZIF)

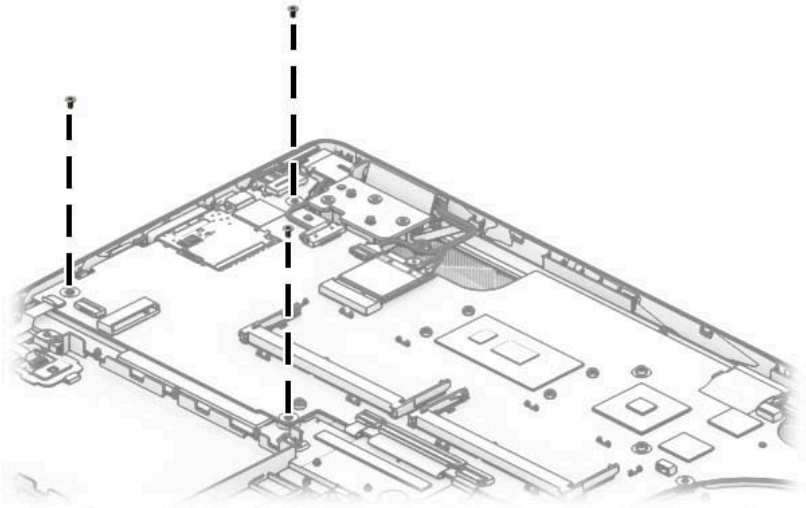
   (9) Backlight cable (ZIF)

(10) Hard drive cable

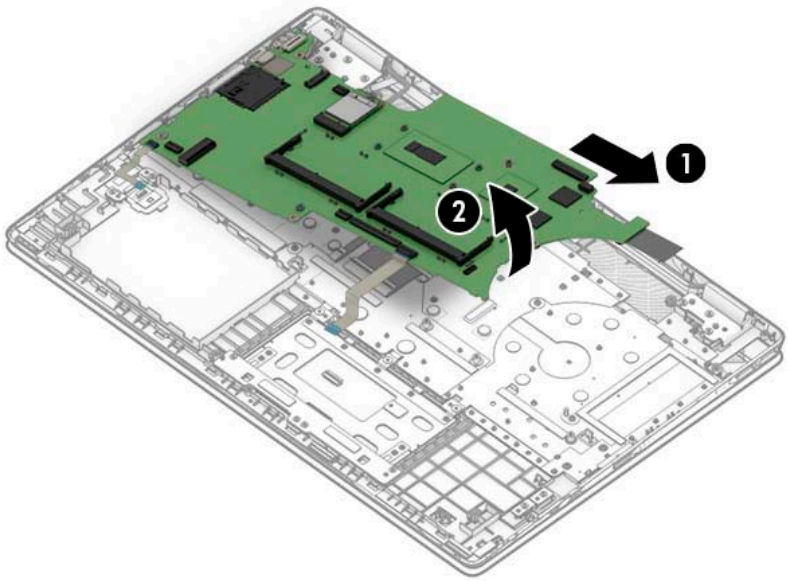
(11) Fingerprint board cable from fingerprint board (ZIF)



2. Remove the three Phillips M2.0 × 3.0 screws that secure the system board to the computer.



3. Lift the right side of the system board **(1)**, and then pull the system board to the right to remove it from the computer **(2)**.



Reverse this procedure to install the system board.

Display assembly

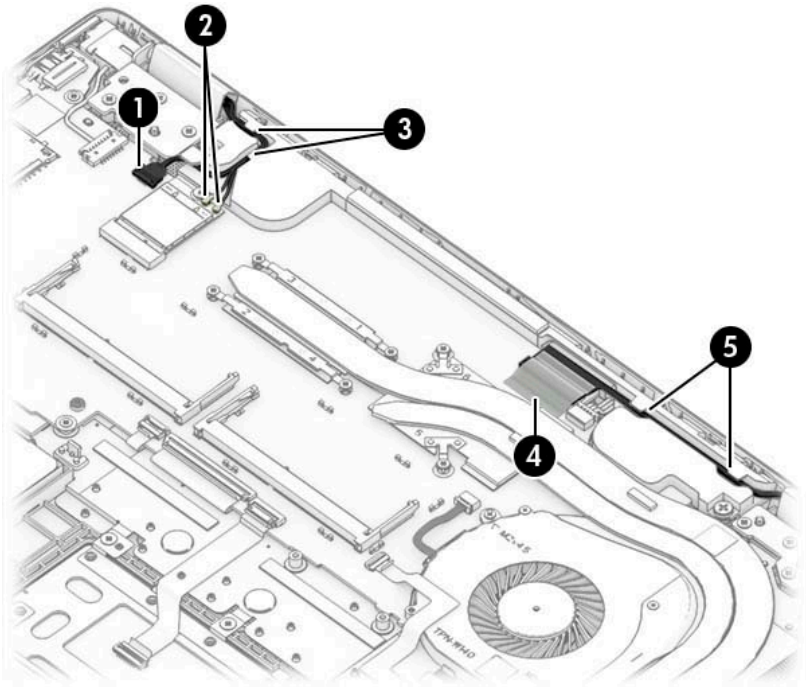
NOTE: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see the individual removal subsections.

Before removing the display assembly, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).

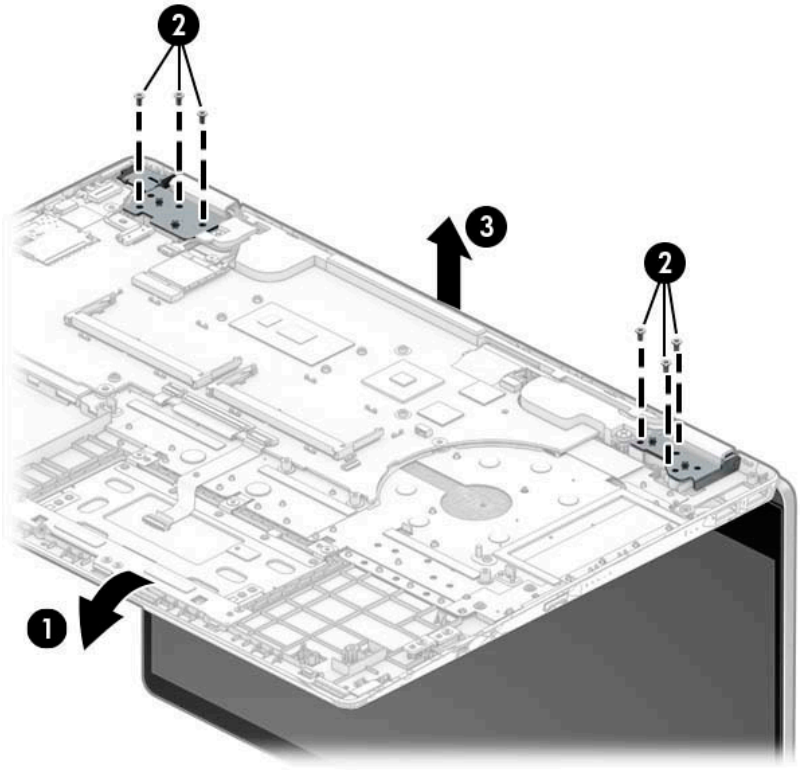
Remove the display assembly:

1. Disconnect the webcam (CCD) cable from the ZIF connector on the system board **(1)**.
2. Disconnect the antenna cables from the WLAN module **(2)**.
3. Remove the webcam cable and antenna cables from the routing channel in the speaker **(3)**.
4. Disconnect the display cable from the ZIF connector on the system board **(4)**.
5. Remove the display cable from the routing channel in the speaker **(5)**.



6. Open the display **(1)**.
7. Remove the three Phillips M2.5 × 6.0 screws **(2)** from each hinge.

8. Separate the display from the computer by pulling the display up and away from the chassis **(3)**.

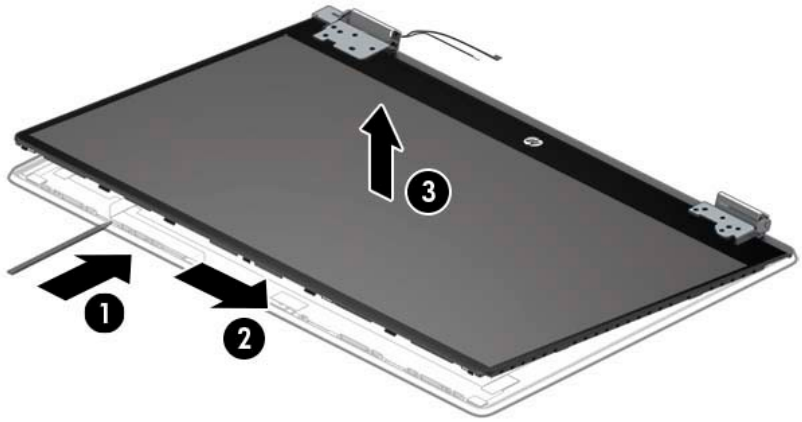


9. To remove the display panel:

   a. Use a plastic tool **(1)** to loosen around the entire display to separate it from the display enclosure **(2)**.

   b. Remove the display panel **(3)**.

      Display panels are available using spare part number L51357-001 for FHD panels and L51358-001 for HD panels.



10. If it is necessary to replace the display cable from the display panel:

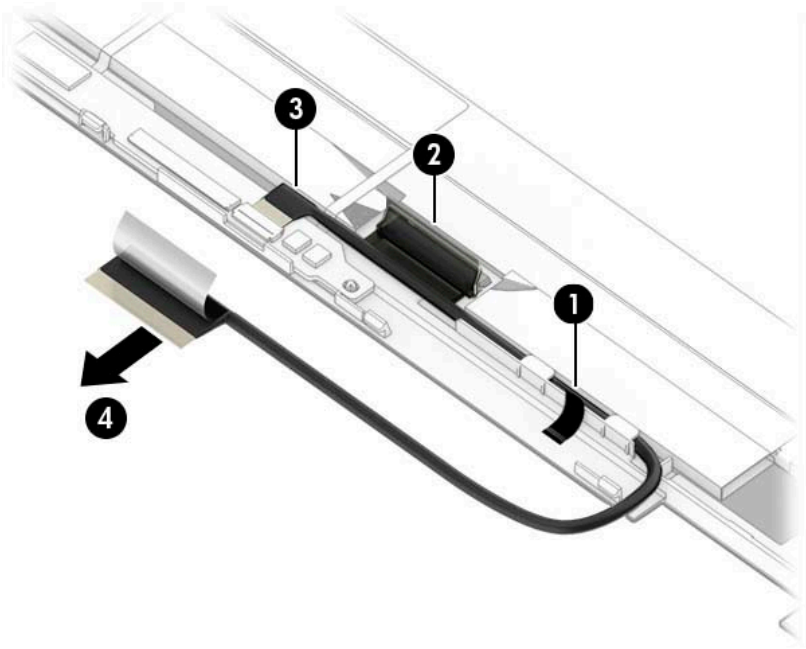
    a. Peel the tape from the top of the display connector at the bottom of the panel **(1)**.

    b. Disconnect the cable from the display panel **(2)**.

c. Disconnect the cable from the g-sensor board **(3)**.

d. Remove the cable from the display **(4)**.

The display cable is available using spare part number L51771-001.



11. If it is necessary to replace the touch control board from the display panel:

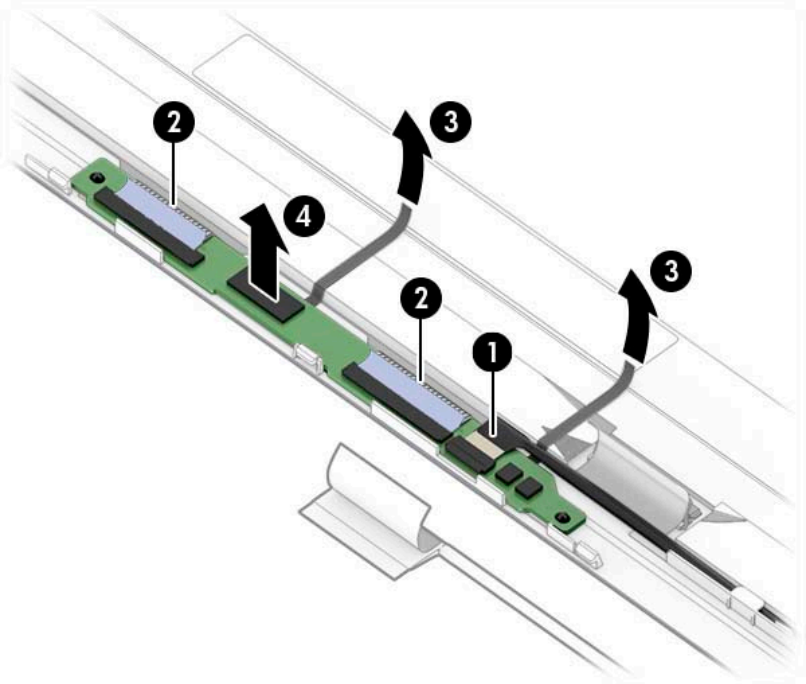
a. Disconnect the cable from the side of the board **(1)**.

b. Disconnect the two cables from the two ZIF connectors on the board **(2)**.

c. Peel the tape that secures the touch control board to the display panel **(3)**.

d. Remove the board from the panel **(4)**.

The touch control board is available using spare part number L51770-001.

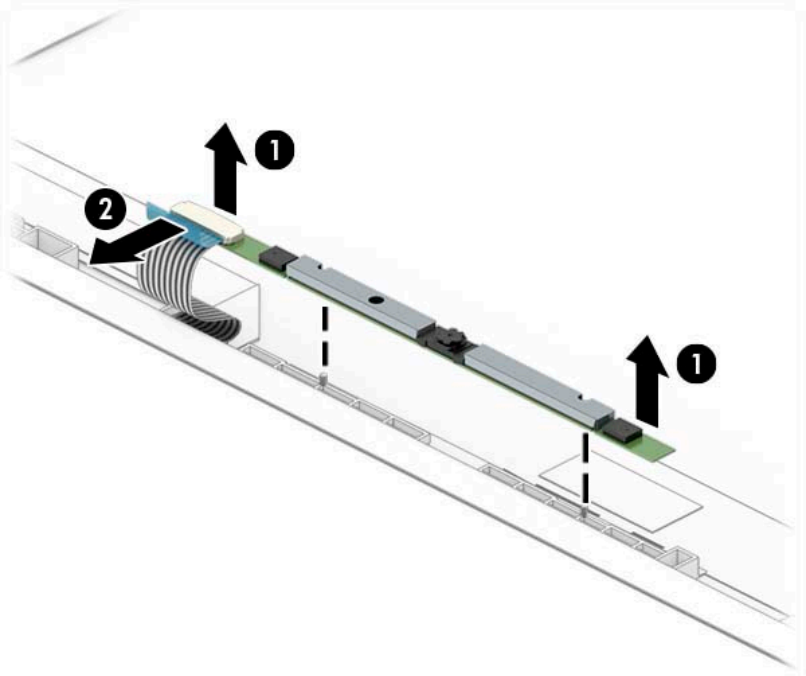


12. If it is necessary to replace the camera/microphone module:

a. Lift evenly on both sides of the module to detach the module from the display back cover **(1)**. The camera/microphone module is attached to the display back cover with double-sided adhesive.

b. Disconnect the cable **(2)** from the camera/microphone module.

The camera/microphone module is available using spare part number L51337-001.

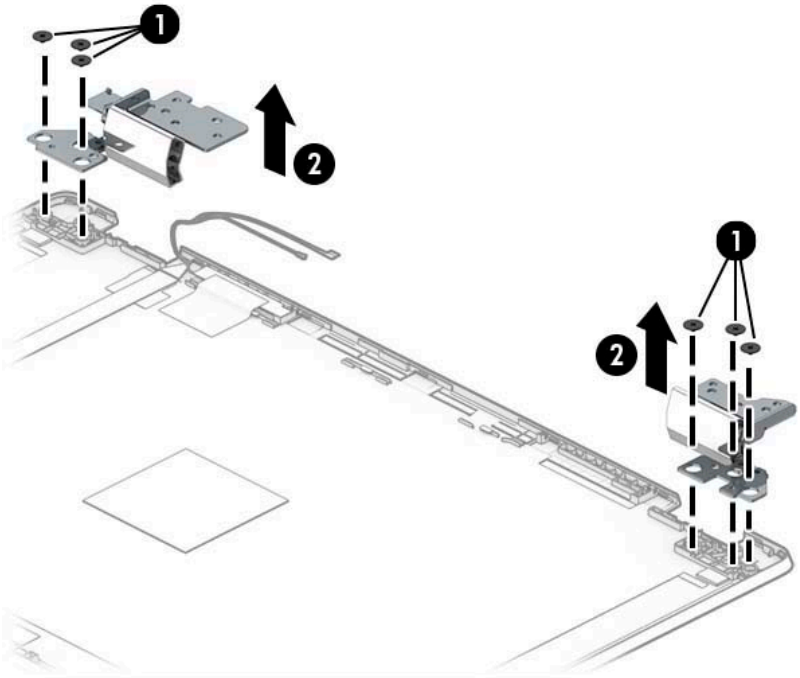


13. If it is necessary to replace the display hinges:

    a. Remove the three Phillips M2.0 × 3.0 screws **(1)** that secure each display hinge to the display back cover.

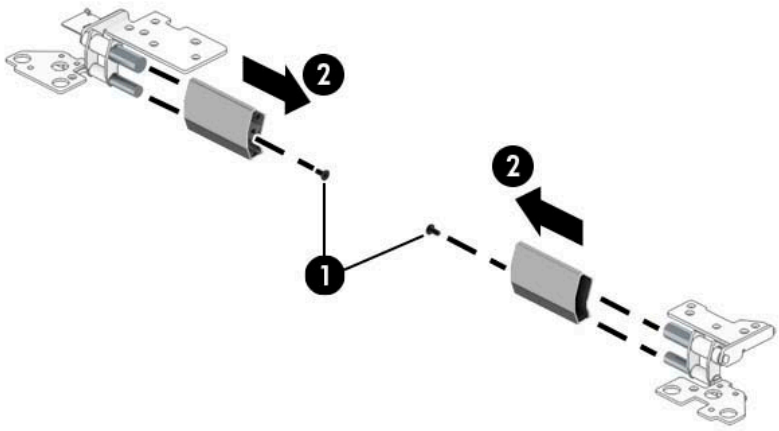
    b. Remove the display hinges **(2)**.

    The display hinges are available using spare part number L51819-001 for models with an FHD display and L51331-001 for models with an HD display.



14. If it is necessary to remove the hinge covers from the hinges, remove the Phillips 2.0 × 3.0 screw from the inside of each hinge **(1)**, and then slide the hinge covers off the hinges **(2)**.

    Hinge covers are available using spare part number L51820-001 for models with an FHD display and L51332-001 for models with an HD display.

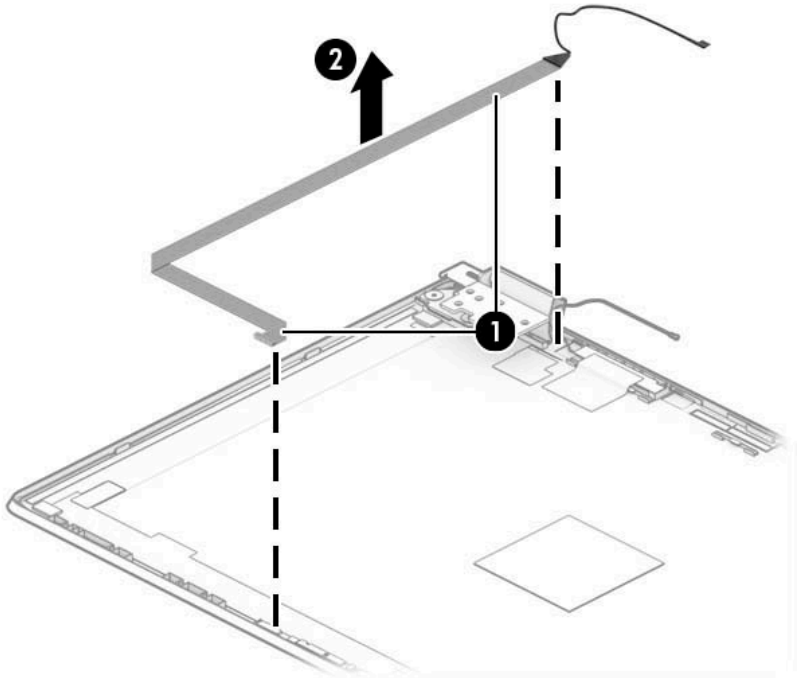


15. If it is necessary to replace the webcam panel cable:

    a. Release the webcam cable from the display back cover **(1)**.

b. Remove the webcam cable **(2)**.

The webcam cable is available using spare part number L51340-001.

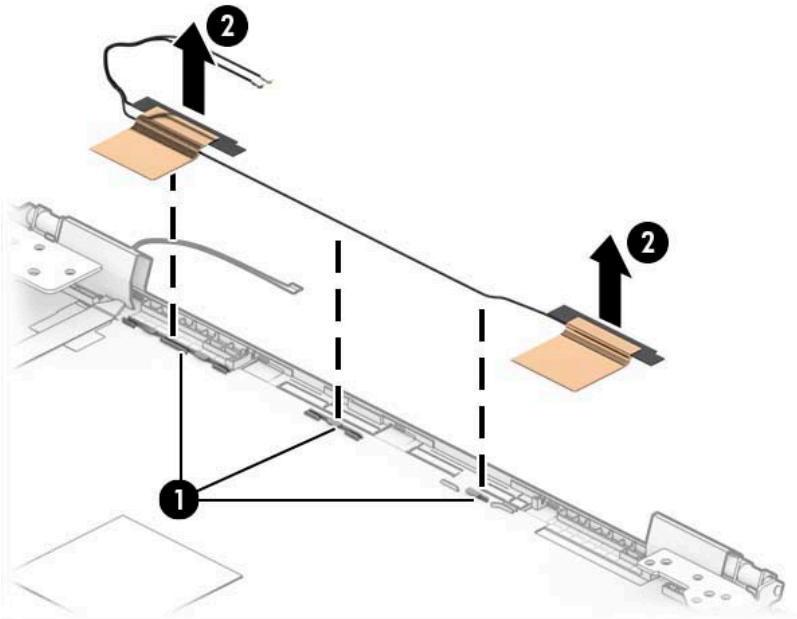


16. If it is necessary to replace the WLAN antennas and cables:

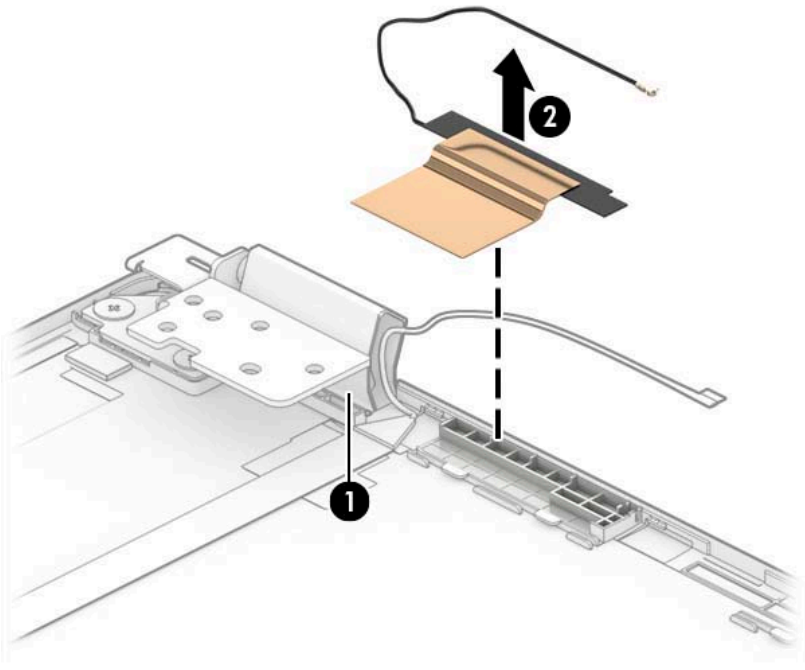
a. Release the cables from the clips and routing channel built into the bottom of the display back cover **(1)**.

b. Detach the WLAN antennas **(2)** from the display back cover. (The antennas are attached to the display back cover with double-sided adhesive.)

The WLAN antennas and cables are available using spare part number L51326-001.



NOTE: The following illustration shows a single antenna.



Display enclosure is available using the following spare part numbers:

L51327-001: HD display, natural silver

L51328-001: HD display, pale gold

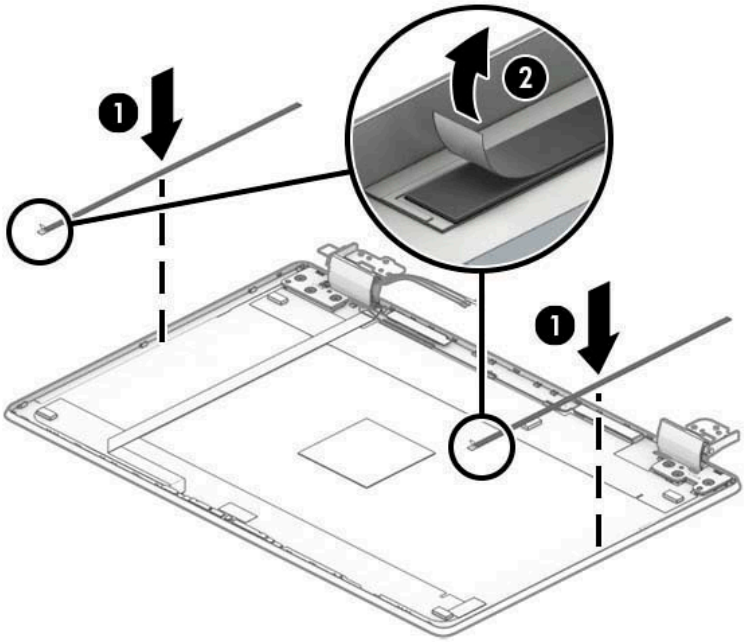
L51329-001: FHD display, natural silver

L51330-001: FHD display, pale gold

17. Use the following images to install the display panel:

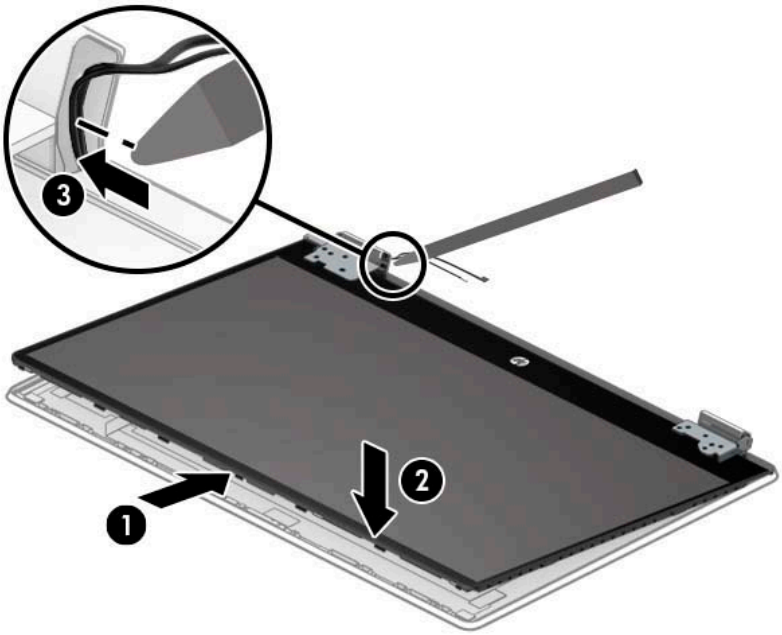
    a. Install the tape on both sides of the display back cover **(1)**.

    b. Pull the backing off the top of the tape **(2)**.



    c. Insert the panel onto the display back cover **(1)**, and then press it downward into place **(2)**.

    d. Use a tool to make sure the display cable and antennas/webcam cable are routed correctly through the hinge caps on the inside of the hinges **(3)**.



Reverse this procedure to reassemble install the display assembly.

Power connector

Table 5-16 Power connector description and part number

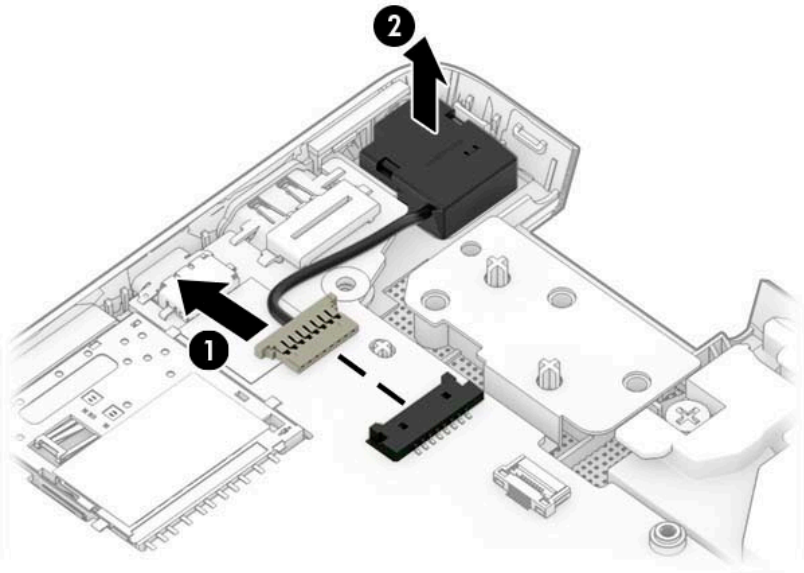
Description	Spare part number
Power connector	L51346-001

Before removing the power connector, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 29).
2. Remove the bottom cover (see Bottom cover on page 30).
3. Remove the battery (see Battery on page 32).
4. Remove the display (see Display assembly on page 59).

Remove the power connector cable:

1. Disconnect the power connector cable from the system board **(1)**.
2. Remove the power connector and cable from the computer **(2)**.



Reverse this procedure to install the power connector cable.

Keyboard/top cover

The top cover with keyboard remains after removing all other spared parts from the computer.

In this section, the first table provides the main spare part number for the keyboards. The second table provides the country codes.

Table 5-17 Keyboard/top cover description and part number

Description	Spare part number
Keyboard/top cover for use in models with a backlit keyboard:	
• With fingerprint reader; natural silver	L51519-xx1
• Without fingerprint reader; natural silver	L51520-xx1
• With fingerprint reader; pale gold	L51521-xx1
• Without fingerprint reader; pale gold	L51522-xx1
Keyboard/top cover for use in models without a backlit keyboard:	
• With fingerprint reader; natural silver	L51362-xx1
• Without fingerprint reader; natural silver	L51363-xx1
• With fingerprint reader; pale gold	L51364-xx1
• Without fingerprint reader; pale gold	L51365-xx1

Table 5-18 Keyboard country codes

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Hungary	-211	Saudi Arabia	-171
Bulgaria	-261	Israel	-BB1	Slovenia	-BA1
Czech Republic and Slovakia	-FL1	Italy	-061	Spain	-071
Denmark, Finland, and Norway	-DH1	Latin America	-161	Switzerland	-BG1
France	-051	The Netherlands	-B31	Turkey	-141
French Canada	-DB1	Portugal	-131	Ukraine	-BD1
Germany	-041	Romania	-271	United Kingdom	-031
Greece	-151	Russia	-251	United States	-001

6 Using Setup Utility (BIOS)

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

NOTE: To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook.

Starting Setup Utility (BIOS)

CAUTION: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

▲ Turn on or restart the computer and quickly press f10.

– or –

Turn on or restart the computer, quickly press esc, and then press f10 when the Start menu is displayed.

Updating Setup Utility (BIOS)

Updated versions of Setup Utility (BIOS) may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To decide whether you need to update Setup Utility (BIOS), first determine the BIOS version on your computer.

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*), use one of these options.

- HP Support Assistant
  1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

     – or –

     Select the question mark icon in the taskbar.
  2. Select **My notebook**, and then select **Specifications**.
- Setup Utility (BIOS)
  1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 69).
  2. Select **Main**, and then make note of the BIOS version.
  3. Select **Exit**, select one of the options, and then follow the on-screen instructions.
- In Windows, press CTRL+Alt+S.

To check for later BIOS versions, see Downloading a BIOS update on page 70.

Downloading a BIOS update

CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
- Do not shut down the computer or initiate Sleep.
- Do not insert, remove, connect, or disconnect any device, cable, or cord.

NOTE: If your computer is connected to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

   – or –

   Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

      Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

BIOS installation procedures vary. Follow any instructions that appear on the screen after the download is complete. If no instructions appear, follow these steps:

1. Type `file` in the taskbar search box, and then select **File Explorer**.
2. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

7 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

HP PC Hardware Diagnostics Windows is a Windows-based utility that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs within the Windows operating system in order to diagnose hardware failures.

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see Downloading HP PC Hardware Diagnostics Windows on page 71.

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support or HP Support Assistant.

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:

   a. Select the **Start** button, and then select **HP Help and Support**.

   b. Right-click **HP PC Hardware Diagnostics Windows**, select **More**, and then select **Run as administrator**.

   – or –

   To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

   a. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

      – or –

      Select the question mark icon in the taskbar.

   b. Select **Troubleshooting and fixes**.

   c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.

2. When the tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test at any time, select **Cancel**.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. The screen displays one of the following options:

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.
- A Quick Response (QR) code is displayed. With a mobile device, scan the code and then follow the on-screen instructions.
- Instructions for calling support are displayed. Follow those instructions.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.
- You must use a Windows computer to download this tool because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics Windows version

To download HP PC Hardware Diagnostics Windows, follow these steps:

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics Windows**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

Downloading HP Hardware Diagnostics Windows by product name or number (select products only)

NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics Windows by product name or number, follow these steps:

1. Go to http://www.hp.com/support.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **Diagnostics** section, select **Download**, and then follow the on-screen instructions to select the specific Windows diagnostics version to be downloaded to your computer or USB flash drive.

The tool is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

To install HP PC Hardware Diagnostics Windows, follow these steps:

- Navigate to the folder on your computer or the USB flash drive where the .exe file was downloaded, double-click the .exe file, and then follow the on-screen instructions.

Using HP PC Hardware Diagnostics UEFI

NOTE: For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 73.

HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

If your PC will not boot into Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in solving the problem:

- Select **Get Support**, and then use a mobile device to scan the QR code that displays on the next screen. The HP Customer Support - Service Center page displays, with your Failure ID and product number automatically filled in. Follow the on-screen instructions.

  – or –

  Contact support, and provide the Failure ID code.

NOTE: To start diagnostics on a convertible computer, your computer must be in notebook mode, and you must use the attached keyboard.

NOTE: If you need to stop a diagnostic test, press esc.

Starting HP PC Hardware Diagnostics UEFI

To start HP PC Hardware Diagnostics UEFI, follow these steps:

1. Turn on or restart the computer, and quickly press esc.
2. Press f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a. Connected USB flash drive

   NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see Downloading the latest HP PC Hardware Diagnostics UEFI version on page 73.

   b. Hard drive

   c. BIOS
3. When the diagnostic tool opens, select a language, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

- HP PC Hardware Diagnostics UEFI is not included in the preinstall image.
- HP PC Hardware Diagnostics UEFI is not included in the HP Tool partition.
- The hard drive is damaged.

NOTE: The HP PC Hardware Diagnostics UEFI download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive:

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics UEFI**, and then select **Run**.

Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)

NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics UEFI by product name or number (select products only) to a USB flash drive:

1. Go to http://www.hp.com/support.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information about Remote HP PC Hardware Diagnostics UEFI, go to http://www.hp.com/go/techcenter/pcdiags, and then select **Find out more**.

Downloading Remote HP PC Hardware Diagnostics UEFI

NOTE: HP Remote PC Hardware Diagnostics UEFI is also available as a Softpaq that can be downloaded to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. Select **Download Remote Diagnostics**, and then select **Run**.

Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number

NOTE: For some products, it may be necessary to download the software by using the product name or number.

To download HP Remote PC Hardware Diagnostics UEFI by product name or number, follow these steps:

1. Go to http://www.hp.com/support.
2. Select **Get software and drivers**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform the following customizations:

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.

- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:

1. Turn on or restart the computer, and when the HP logo appears, press f10 to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.
3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.

8 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see Using Windows tools on page 76).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 76).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 76).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see Using Windows tools on page 76).

IMPORTANT: If you will be performing recovery procedures on a tablet, the tablet battery must be at least 70% charged before you start the recovery process.

IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning any recovery process.

Backing up information and creating recovery media

Using Windows tools

IMPORTANT: Windows is the only option that allows you to back up your personal information. Schedule regular backups to avoid information loss.

You can use Windows tools to back up personal information and create system restore points and recovery media.

NOTE: If computer storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get Help app.

1. Select the **Start** button, and then select the **Get Help** app.
2. Enter the task you want to perform.

NOTE: You must be connected to the Internet to access the Get Help app.

Using the HP Cloud Recovery Download Tool to create recovery media (select products only)

You can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive.

To download the tool:

▲ Go to the Microsoft Store and search for HP Cloud Recovery.

For details, go to http://www.hp.com/support, search for HP Cloud Recovery, and then select "HP PCs – Using the Cloud Recovery Tool (Windows 10, 7)."

NOTE: If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to http://www.hp.com/support, select your country or region, and then follow the on-screen instructions.

Restoring and recovery

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see Using Windows tools on page 76.

Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 76.

NOTE: If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to http://www.hp.com/support, select your country or region, and then follow the on-screen instructions.

To recover your system:

- Insert the HP Recovery media, and then restart the computer.

Changing the computer boot order

If your computer does not restart using the HP Recovery media, you can change the computer boot order. This is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection to an optical drive or a USB flash drive, depending on the location of your HP Recovery media.

To change the boot order:

IMPORTANT: For a tablet with a detachable keyboard, connect the tablet to the keyboard base before beginning these steps.

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

   For computers or tablets with keyboards attached:

   - Turn on or restart the computer or tablet, quickly press esc, and then press f9 for boot options.

   For tablets without keyboards:

   - Turn on or restart the tablet, quickly hold down the volume up button, and then select **f9**.

     – or –

     Turn on or restart the tablet, quickly hold down the volume down button, and then select **f9**.
3. Select the optical drive or USB flash drive from which you want to boot, and then follow the on-screen instructions.

9 Specifications

Table 9-1 Computer specifications

	Metric	U.S.
Computer dimensions		
Width	**359.0 mm**	14.13 in
Depth	**241.6 mm**	9.51 in
Height, FHD models	**19.9 mm**	0.78 in
Height, HD models	**20.7 mm**	0.82 in
Weight, solid-state drive	**1926.0 g**	4.25 lbs
Weight, solid-state drive + hard drive	**2014.0 g**	4.44 lbs
Input power	**Rating**	
Operating voltage and current	19.5 V dc @ 2.31 A – 45 W 19.5 V dc @ 3.33 A – 65 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

10 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 V ac, or from 220 to 240 V ac.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries or regions must meet the requirements of the country and region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Table 10-1 Power cord requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	BIS	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

Table 10-1 Power cord requirements for specific countries and regions (continued)

Country/region	Accredited agency	Applicable note number

2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

11 Recycling

When a non-rechargeable or rechargeable battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

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